MICROMMAC-22T/24T/42T/44T STACKABLE TOKEN RING INTELLIGENT HUBS

USER'S GUIDE

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The Complete Networking Solution™

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CHAPTER 1

INTRODUCTION

Welcome to the Cabletron Systems **MicroMMAC-22T/-24T/-42T/ -44T Stackable Token Ring Intelligent Hub User's Guide**. This manual provides installation instructions, network requirements, reference information, and operating instructions for the MicroMMAC-T (Figure 1-1) family of stackable hubs. Installing the MicroMMAC-T requires familiarity with the physical layer components of Token Ring (IEEE 802.5) data communications networks.

NOTE: Unless otherwise specified, this manual uses the term MicroMMAC-T to collectively refer to the MicroMMAC-22T, the MicroMMAC-24T, the MicroMMAC-42T, and the MicroMMAC-44T.
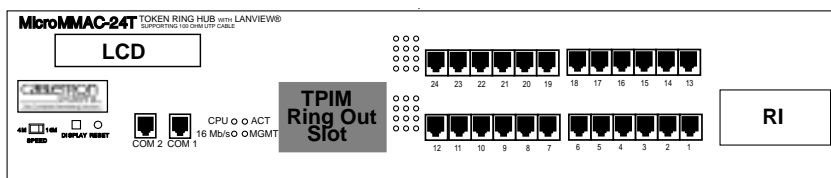
Figure 1-1. The MicroMMAC-T

1.1 CONTENTS OVERVIEW

This manual contains the following information:

Chapter 1, **Introduction**, outlines the contents of this manual and describes features of the MicroMMAC-T and its add-on components. It also lists sources where more information on Token Ring network implementation can be found.

Chapter 2, **Requirements/Specifications**, describes cabling requirements, network guidelines, and MicroMMAC-T operating specifications.

Chapter 3, **Installation,** contains MicroMMAC-T installation instructions and discusses network connections using various media types. This chapter includes instructions for setting the Ring Speed Switch, the Reset Switch, the NVRAM Switch, and the TPIM Phantom Switch. It also

describes how to install a TPIM and concludes with installation check-out instructions.

Chapter 4, **Local Management**, explains how to set up and use a management terminal and a modem to access Local Management.

Chapter 5, **Troubleshooting**, explains how to monitor the operation performance of the MicroMMAC-T using LANVIEW® LEDs and LCD's. It also explains how to access POWER UP diagnostic test information.

1.2 MicroMMAC-T OVERVIEW

The MicroMMAC-T is an intelligent, stackable Multi-Media Access Center providing connectivity and SNMP management for up to 255 Token Ring users (Local Management for up to 120 Token Ring users) in remote office environments. The MicroMMAC-T can be used in conjunction with Cabletron's STH HubSTACK series of stackable non-intelligent hubs.

Figure 1-2 illustrates a typical MicroMMAC-T configuration scenario. Attachable Bridge/Routing Interface Modules (BRIMs), incorporated as seamless entities within the MicroMMAC-T, provide connectivity not only to standard Token Rings but also to Ethernet, FDDI, ATM, and WAN environments, depending upon the BRIM types used.

Token Ring Port Interface Modules (TPIMs) attachable at the Ring In/Ring Out (RI/RO) ports provide connectivity and expanded trunk connections to a range of Token Ring media: Unshielded Twisted Pair (UTP), Shielded Twisted Pair (STP), and Fiber.

By installing Cabletron's MicroSNAC daughterboard in the MicroMMAC-T, you can consolidate SNA/SDLC, BSC, LAN, and WAN connectivity into a single unit.

Telnet support provides easy access to Local Management tools from any TCP/IP based node on the network.

The MicroMMAC-T complies with the IEEE 802.5 standard and is fully IBM Token Ring compatible. The remainder of this chapter discusses MicroMMAC-T features in greater detail.
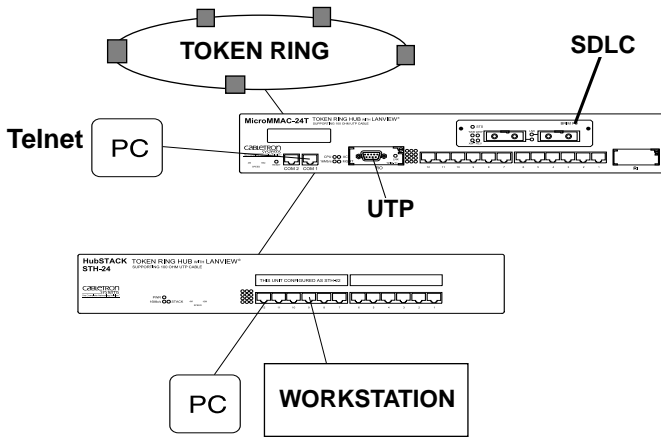
Figure 1-2. Typical MicroMMAC-T Configuration Scenario

All MicroMMAC-Ts are functionally and physically identical except for the number and type of their Trunk Connection Unit (TCU) lobe ports. The following MicroMMAC-T configurations are available:

- **MicroMMAC-22T**: twelve active RJ45 TCU lobe ports that support category 3, 4, and 5 UTP cabling.

- **MicroMMAC 24T**: twenty-four active RJ45 TCU lobe ports that support category 3, 4, and 5 UTP cabling.

- **MicroMMAC-42T**: twelve active RJ45 TCU lobe ports that support IBM Type 1, 2, 6, and 9 STP cabling.

- **MicroMMAC-44T**: twenty-four active RJ45 TCU lobe ports that support IBM Type 1, 2, 6, and 9 STP cabling.

1.3 MicroMMAC-T FEATURES

NOTE: Call your Cabletron Sales representative to order the 12-port upgrade kit, the MicroSNAC device, BRIMs, TPIMs, interface cables, and other accessories for the MicroMMAC-T.

Active TCU Ports

The active TCU ports regenerate, reshape, and filter the incoming signal, permitting UTP lobe cable lengths of up to **120 meters** and STP lobe cable lengths up to **150 meters** at 16 Mbps ring speed. The MicroMMAC-22T and the MicroMMAC-42T can be upgraded in the field using the Cabletron UTP and STP 12-port upgrade kits.

Cable Signal Polarity

Differential Manchester encoding is used for each concentrator module TCU port. This permits passing data regardless of receive link polarity.

NOTE: The MicroMMAC-T is not affected by the reversed polarity condition. If, however, such a condition is discovered, the segment should be removed from the network and wired correctly to avoid problems during future network operations. Refer to Section 3.8 for cable pinouts specifications

Speed Fault Protection

If a station attempts to insert into a ring port at a different speed from the one set on the MicroMMAC-T, that port is automatically bypassed to prevent the ring from beaconing. The Lobe Port Status LED blinks red (for more information, see Section 5.1, USING LANVIEW LEDs) to indicate that the port with the speed fault is being bypassed.

Local Management

Local Management provides you with the ability to manage the MicroMMAC-T and all of its attached segments, including most BRIMs and the MicroSNAC device. The CR BRIM-W/T and the MicroSNAC provide their own configuration firmware.

Access Local Management by connecting an actual or emulated Digital Equipment Corporation VT100™ series terminal to the MicroMMAC-T's COM 1 port or the COM 2 port. To view diagnostic test information from a display terminal, use the COM 2 port.

Token Ring Port Interface Modules (TPIMs)

TPIMs are modular connector cards used for expanding trunk connections to a range of Token Ring media. TPIMs have embedded repeaters that

re-time all data. Cabletron offers a variety of TPIMs for RI/RO trunk connections as shown in Table 1-1.

Table 1-1.   TPIMs

TPIM	Media Type	Connector
TPIM-T1	Shielded Twisted Pair	DB9
TPIM-T2	Unshielded Twisted Pair	RJ45
TPIM-T4	Shielded Twisted Pair	RJ45
TPIM-F2	Multimode Fiber Optic	ST
TPIM-F3	Single mode Fiber Optic	ST

Ring Speed Switch

Use the Ring Speed Switch to select either 4 or 16 Mbps ring speed.

Flash EEPROM

The firmware image on the MicroMMAC-T can be upgraded by Flash EEPROM downloads via Cabletron System's Remote LANVIEW/Windows version 2.3 or later, or via any server supporting BOOTP or TFTP protocols.

LANVIEW LEDs

Cabletron Systems' LANVIEW LEDs, located on the face of the MicroMMAC-T, provide an effective monitoring and troubleshooting tool to help diagnose power failures, RI/RO status, cable faults, ring speed, link problems, and network activity. See Section 5.1 for information about using LEDs.

Cabletron's Distributed LAN Monitor Mode

To manage a network that includes multiple subnets, remote network management stations need to query multiple management devices, increasing the data traffic on the network. Network managers can reduce the amount of management related traffic by setting the MicroMMAC-T into Distributed LAN Monitor mode via a remote management package. The MicroMMAC-T in DLM mode will collect management data from the

numerous management devices and serve as their management data representative. The network management station then has to query only one management device, the MicroMMAC-T in DLM mode, to access management data for all management devices on the network.

Consult your network manager for DLM setup.

COM Port Applications

Both of the front panel COM ports are factory-configured to support Local Management connections. Select among configuration options for Local Management, Uninterruptible Power Supplies (UPS), the Serial Line Internet Protocol (SLIP), and modems.

LCD and LCD Display Button

MicroMMAC-T's front panel LCD used in conjunction with the LCD display button provides you with comprehensive system-level information such as power-up diagnostics, FLASH image revision levels, IP addresses, and error alerts. See Section 5.2 for more information.

Reset Button

The Reset button on the front panel initializes the processor when pressed. The information contained in NVRAM is retained after initialization. See Section 3.5 for more information.

MIB Support

The MicroMMAC-T provides access to the following Management Information Bases:

Standard MIBs

- MIB-2 (RFC 1231)

- IEEE RMON MIB (RFC 1271)

- RMON Extensions for Token Ring (RFC 1513)

Cabletron Enterprise MIBs

- Download

- MIB-II Extensions

- Token Ring FNB (Flexible Network Bus)

- DOT 5 Logical and Physical

- UPS (Uninterruptible Power Supply)

- Device

- DLM (Distributed LAN Monitor)

- PIC MIB (Product Information Chip MIB)

- Chassis MIB

RMON MIB Support

The MicroMMAC-T supports the RMON MIB RFC 1271/1513 Token Ring Extensions shown in Table 1-2.

Table 1-2.   RMON MIB RFC 1271/1513 Support

Group	Subgroup	Section
Statistics rmon 1	Token Ring ML Stats Table Token Ring P Stats Table	statistics 2 statistics 3
History rmon 2	History Control Table Token Ring ML History Table Token Ring P History Table	history 1 history 3 history 4
Alarm rmon 3	Alarm Table	alarm 1
Host rmon 4	Host Control Table Host Table Host Time Table	hosts 1 hosts 2 hosts 3
HostTopN rmon 5	HostTopN Control Table HostTopN Table	hostTopN 1 hostTopN 2
Matrix rmon 6	Matrix Control Table Matrix SD Table Matrix DS Table	Matrix 1 Matrix 2 Matrix 3

Table 1-2.   RMON MIB RFC 1271/1513 Support (Cont.)

Group	Subgroup	Section
Event	Event Table	event 1
rmon 9	Log Table	event 2
Token Ring	Ring Station Control Table	Token Ring 1
rmon 10	Ring Station Table	Token Ring 2
	Ring Station Order Table	Token Ring 3
	Ring Station Config Control Table	Token Ring 4
	Ring Station Config Table	Token Ring 5
	Source Routing Stats Table	Token Ring 6

1.4 STACKABLE CAPABILITIES

The MicroMMAC-T can be stacked with up to four HubSTACK STH series non-intelligent hubs as shown in Figure 1-3. Four connectors are available on the back panel of the MicroMMAC-T for connecting STH 12/24 type non-intelligent hubs. The MicroMMAC-T provides complete management, including full packet and error statistics for the entire stack, individual device, or individual port.

It is not necessary to power-off the MicroMMAC-T to add or remove hubs from the stack.

REAR VIEW

MicroMMAC Managing 4 Non-Intelligent Hubs
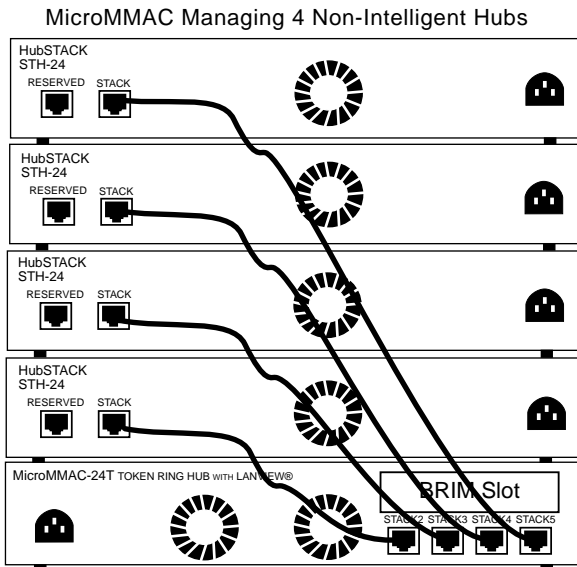
Figure 1-3. Typical Stackable Configuration

NOTE: Token Ring HubSTACK Interface cables, which are used to connect between the MicroMMAC-T and stacked STH hubs, are not included with the MicroMMAC-T.

1.5 BRIDGING/ROUTING CAPABILITIES

A slot on the back panel of the unit provides installation access for BRIMs to the hub. MicroMMAC-T management systems treat the installed BRIM and the hub as a single entity. Cabletron offers the BRIMs listed in Table 1-3.

Table 1-3.   BRIMs

BRIM	Description
BRIM-E6	Ethernet Connection
BRIM-W6	Wide Area Network (Full or Fractional T1; 56k DDS)
BRIM-A6	Asynchronous Transfer Mode Connection
BRIM-T6	Token Ring Connection
CR BRIM-W/T	Cisco WAN BRIM for Token Ring
BRIM-FO	Fiber Distributed Data Interface Connection

1.5.1 SNA/WAN Integration

The MicroSNAC add-on daughterboard provides two ports, both of which can be used to provide conversion from SNA/SDLC or BSC links to LLC2. The MicroSNAC can operate in a converter mode or as a WAN concentrator.

1.6 REMOTE MANAGEMENT CAPABILITIES

The MicroMMAC-T may be managed through any Simple Network Management Protocol (SNMP) software. Cabletron Systems offers the following remote management packages:

- Cabletron Systems SPECTRUM®

- Cabletron Systems Remote LANVIEW®/Windows™

- Cabletron Systems Remote SPECTRUM® Portable Management Applications

1.7 TELNET CAPABILITIES

The MicroMMAC -T supports Telnet, which allows any TCP/IP based node on the network to establish a Local Management session with the

module. This feature complements the remote SNMP management and allows for quick hub configuration changes or checks.

1.8 RECOMMENDED READING

The following publications provide more information on Token Ring network implementation.

Local Area Networks, Token Ring Access Method, IEEE Standard 802.5 (1989)

Commercial Building Wiring Standard, EIA/TIA-568

LAN Troubleshooting Handbook, Mark Miller (1989, M&T Publishing)

1.9 GETTING HELP

For additional support related to the Cabletron Systems MicroMMAC-T, or for any questions, comments, or suggestions concerning this manual, contact Cabletron Systems Technical Support:

By phone. . . . . (603) 332-9400
                                                    Monday-Friday; 8am - 8pm EST

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                                                    Rochester, NH 03866-5005

CHAPTER 2

REQUIREMENTS/SPECIFICATIONS

Read this chapter prior to installing the MicroMMAC-T. It contains operating specifications and requirements for power and cabling. To obtain satisfactory performance from this equipment, networks must meet the requirements and conditions specified in this chapter. Failure to follow these guidelines may result in poor network performance.

2.1 CABLE SPECIFICATIONS

Token Ring architecture provides for a set of Trunk Coupling Units (TCUs) connected by trunk cabling. To extend the trunk cabling, install TPIMs into the MicroMMAC-T's RI/RO ports. TPIMs have embedded repeaters and provide trunk connections for UTP, STP, Multimode Fiber, and Single Mode Fiber cabling.

Attach stations to the TCU lobe ports with lobe cabling. Figure 2-1 shows a typical ports to cables configuration.
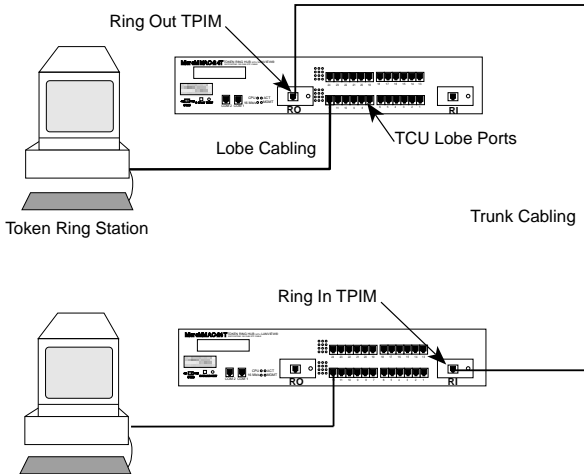
Figure 2-1. MicroMMAC-T Ports/Cables

2.1.1 UTP Cable Specifications

The MicroMMAC-22T and MicroMMAC-24T lobe ports and the TPIM-T2 support voice grade Unshielded Twisted Pair (UTP) cable, as described in specifications for EIA/TIA TSB 568 and IBM Type 3 cable.

UTP consists of four pairs of 24 AWG solid wire for data or voice communication and is typically used to wire cable runs within building walls. In some installations, existing UTP building wiring can be used for Token Ring cabling. UTP cable must conform to the limits shown in Table 2-1.

WARNING: DO NOT connect UTP cabling to any non-Token Ring network conductors (telephone, etc.) or ground. If in doubt, test wiring before using. The voltages used in UTP telephone circuits present a shock hazard and can damage Token Ring equipment when connected to Token Ring cabling.

The increased popularity and cost advantages of UTP cable have driven refinements in UTP cable design. Better grades of UTP cable, known as supergrade or level 4, provide improved transmission characteristics and may allow operation at 16 Mbps on longer lobe cables.

Attenuation and Impedance

The values listed in Figure 2-1 include the maximum attenuation of the cables, connectors, patch panels, and reflection losses due to impedance mismatches in the segment.

Table 2-1.   UTP Voice Grade and Category 3 Specifications

Frequency	Impedance	Attenuation
1 MHz	100Ω ±15%	<26 dB/km (8 dB/1000 ft)
4 MHz	100Ω ±15%	<56 dB/km (16 dB/1000 ft)
10 MHz	100Ω ±15%	<98 dB/km (30 dB/1000 ft)
16 MHz	100Ω ±15%	<131 dB/km (40 dB/1000 ft)

Maximum Lobe Lengths

Lobe length is the physical length of the cable connecting a station to its TCU port at the MicroMMAC-T. Table 2-2 lists the maximum lobe cable length for ring speeds of 4 and 16 Mbps. The values listed refer to total lengths made up of UTP cable only.

Table 2-2.   UTP Maximum Lobe Lengths

UTP Cable Type	Maximum Lobe Length	
	4 Mbps	**16 Mbps**
Category 3	200 meters	100 meters
	(656 feet)	(328 feet)
Category 4	200 meters	100 meters
	(656 feet)	(328 feet)
Category 5	250 meters	120 meters
	(820 feet)	(394 feet)

Type 3 Media Filters

A Type 3 Media Filter is required when connecting a UTP lobe segment from a MicroMMAC-22T or MicroMMAC-24T to a station supporting STP cabling. Cabletron Systems offers the following Type 3 Media Filters:

- **TRMF**, RJ45 (UTP) connector to 10-inch DB9 (STP) cable with LANVIEW
- **TRMF-2**, RJ45 (UTP) connector to DB9 (STP) connector

Maximum Number of Stations

When UTP lobe cabling is used in any ring segment, the number of ring stations supported by the MicroMMAC-T is limited to **150**, regardless of the operating ring speed.

2.1.2 STP Cable Specifications

MicroMMACs 42T and 44T and TPIMs T1 and T4 support IBM Type 1, 2, 6, and 9 STP cabling as described below:

- **IBM Type 1:** Two STP lengths of 22 AWG solid wire for data. Used for the longest cable runs within building walls of buildings.

- **IBM Type 2**: Similar to Type 1 data cable, but having four additional UTP lengths of 22 AWG solid wire carried outside of the shield casing. Typically used for voice communication and often used to wire cable runs within the walls of buildings.

- **IBM Type 6**: Two STP lengths of 26 AWG stranded wire for data. Used in patch panels or to connect devices to/from wall jacks. Attenuation for Type 6 cable is 3/2 x Type 1 cable (66 m of Type 6 =100 meters of Type 1).

- **IBM Type 9**: Similar to Type 1, but uses 26 AWG solid wire. Attenuation for Type 9 cable is 3/2 x Type 1 cable (66 m of Type 9 = 100 meters of Type 1).

Attenuation and Impedance

The attenuation values shown in Table 2-3 include the attenuation of the cables, connectors, patch panels, and reflection losses due to impedance mismatches in the segment

Table 2-3.   STP Cable Specifications

Types	Frequency	Impedance	Attenuation
1 & 2	4 MHz	150Ω ± 15%	<22 dB/km (6.7 db/1000 ft.)
	16 MHz	150Ω ± 15%	<45 dB/km (13.7 db/1000 ft.)
6 & 9	4 MHz	150Ω ± 15%	<33 dB/km (10 db/1000 ft.)
	16 MHz	150Ω ± 15%	<66 dB/km (20 db/1000 ft.)

Maximum Lobe Lengths

The lobe length is the physical length of the cable connecting a station to its TCU port at the MicroMMAC-T. Table 2-4 lists the maximum lobe

cable length for ring speeds of 4 and 16 Mbps. The cable lengths listed in Table 2-4 refer to total lengths made up of STP cable only

Table 2-4.   STP Maximum Lobe Lengths

STP Cable Type	Ring Speed	
	4 Mbps	**16 Mbps**
IBM Types 1 & 2	300 meters (984 feet)	150 meters (492 feet)
IBM Types 6 & 9 (only for station to wall jack and patch panels)	30 meters (99 feet)	30 meters (99 feet)

Maximum Trunk Lengths

The maximum trunk cable length between the MicroMMAC-T and other active devices is equal to the maximum drive distance as shown in Table 2-5. For passive devices, the combined length of twice the longest trunk cable, plus the longest lobe cable attached to the passive ring segment cannot exceed the Maximum Drive Distance.

Table 2-5.   STP Maximum Drive Distance

STP Cable Type	Ring Speed	
	4 Mbps	**16 Mbps**
IBM Types 1 & 2	770 meters (2525 feet)	346 meters (1138 feet)
IBM Types 6 & 9	513 meters (1683 feet)	230 meters (755 feet)

Maximum Number of Stations

If only STP lobe cabling is used throughout the ring, the MicroMMAC-T supports up to 255 ring stations, regardless of ring speed.

Mixed Cable Types

If multiple cable types exist in network, compensations must be made for the different cable attenuations. Type 6 and Type 9 cables can run only 2/3 the distance of Type 1. Therefore 10 meters of Type 1 ≈ 6.6 meters of Types 6 and 9.

2.1.3   Multimode Fiber Optic Cable Specifications

Table 2-6 shows specifications for the Multimode Fiber Optic Cable supported by TPIM-F2

Table 2-6.   Multimode Fiber Optic Cable Specifications

Cable Type	Attenuation	Maximum Drive Distance
50/125 μm	13.0 dB or less	The maximum allowable fiber optic cable length is 2 km (2187.2 yards). However, IEEE 802.5 specifications allow for a maximum of 1 km (1093.6 yards).
62.5/125 μm	16.0 dB or less	
100/140 μm	19.0 dB or less	

Maximum Trunk Lengths

The maximum trunk cable length between the MicroMMAC-T and other active devices is equal to the maximum drive distance as shown in Table 2-6. For passive devices, the combined length of twice the longest trunk cable, plus the longest lobe cable attached to the passive ring segment, must not exceed the Maximum Drive Distance Trunk Length.

Attenuation

Fiber optic cable must be tested with an attenuation test set adjusted for an 850 nm wavelength. This test ensures that a cable's signal loss is within acceptable limits. Table 2-6 shows the attenuation for each Multimode cable type.

Fiber Optic Budget

The fiber optic delay budget, which determines the fiber optic cable's maximum length, should be calculated and taken into consideration in the network design stage. Fiber optic delay budget is determined by summing the optical signal loss due to fiber optic cable attenuation, in-line splices, and fiber optic connectors.

2.1.4 Single Mode Fiber Optic Cable Specifications

Table 2-7 shows specifications for the Single Mode Fiber Optic Cable supported by TPIM-F3.

Table 2-7.   Single Mode Fiber Optic Cable Specifications

Cable Type	Attenuation	Maximum Drive Distance
8/125-12/125 μm	10.0 dB or less	The max. allowable fiber optic cable length is 10 km (10936 yards). However, IEEE 802.5 specs allow for a max. of 1 km (1093.6 yards).

Maximum Trunk Lengths

The maximum trunk cable length between the MicroMMAC-T and other active devices is equal to the Maximum Drive Distance as shown in Table 2-7. For passive devices, the combined length of twice the longest trunk cable plus the longest lobe cable attached to the passive ring segment must not exceed the Maximum Drive Distance Trunk Length.

Attenuation

Fiber optic cable must be tested with an attenuation test set adjusted for a 1300 nm wavelength. This test ensures that the cable's signal loss is within an acceptable range of 10 dB or less for any given single mode fiber optic link.

Fiber Optic Budget

The fiber optic delay budget, which determines the fiber optic cable's maximum length, should be calculated and taken into consideration in the network design stage. Fiber optic delay budget is determined by summing the optical signal loss due to fiber optic cable attenuation, in-line splices, and fiber optic connectors.

2.2 CABLE RECOMMENDATIONS/TROUBLESHOOTING

The following sections describe common cable problems and recommendations for correcting them.

Crosstalk

Crosstalk is interference caused by signal coupling between different cable pairs contained within a multi-pair cable bundle. Multi-pair cables should not be used for UTP lobe cabling. UTP lobe cabling should be dedicated to carrying Token Ring traffic. Avoid mixing Token Ring signals with other applications (voice, etc.) within the same cable.

Noise

Noise can be caused by crosstalk or externally imposed impulses. If noise-induced errors are suspected, ensure that the electrical wiring in the area is properly wired and grounded and/or try re-routing cabling away from potential noise sources (motors, switching equipment, fluorescent lighting, high amperage equipment).

Temperature

The attenuation of PVC-insulated cable varies significantly with temperature. Check the cable manufacturer's specifications. Plenum-rated cables are strongly recommended in areas where temperatures exceed 40°C. Under such conditions, plenum-rated cables ensure that cable attenuation remains within specifications.

Other Considerations

In addition to complying with the preceding cable specifications, the following recommendations should be followed to minimize errors and obtain optimum performance from the network:

• UTP cabling should be free of splices, stubs, or bridged taps.

• Maintain a two punch-down block limit between TCU ports and wall outlets.

• Properly ground metal troughs, ducts, etc. carrying Token Ring signals.

• Avoid routing Token Ring signals near copper cables that exit a building or are susceptible to lightning strikes and power surges.

• UTP cables containing Token Ring signals should not be simultaneously used for applications which may impress high voltages (greater that 5 volts) with sharp rise or fall times. The noise coupling from such signals could directly cause errors on the Token Ring network.

• Lobe lengths between TCU ports and connected devices should not exceed 100 meters of 22 to 24 AWG wire.

• Wherever possible, use dedicated UTP cable for Token Ring signals.

2.3 COM PORT SPECIFICATIONS

The RJ45 COM 1 and COM 2 ports (Figure 2-2) support Local Management applications. A description of COM port applications is listed below:
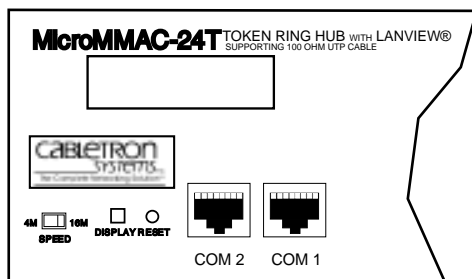
Figure 2-2. COM 1/COM 2 Ports

Local Management

Both COM 1 and COM 2 ports are factory-configured to support Local Management access by an actual or emulated Digital Equipment Corporation VT 100™ terminal.

Booting/Diagnostics

Terminal display of POWER UP booting/diagnostic tests available only when terminal is connected to COM 2 (for information about Boot sequences, see Section 5.3).

UPS

COM 2 supports Uninterruptible Power Supply (American Power Conversion only).

SLIP

Both COM ports support Serial Line Internet Protocol (SLIP).

Modem

Both COM ports support modem connection.

2.4 TPIM SPECIFICATIONS

TPIMs provide Ring In/Ring Out (RI/RO) connections that can extend the network through a variety of media. Each TPIM has an embedded repeater that re-times all data.

The LNK (Link) LED on each TPIM provides the following information:

- Green - RI or RO active
- Red (TPIM-T1/T2/T4 only) - No Link (Autowrapped)
- Off - No Link (Wrapped or Disabled)

TPIM-T1

TPIM-T1 provides a female DB9 connector that supports STP cabling. Figure 2-3 shows TPIM-T1 pinouts for Ring Out and Ring In applications.
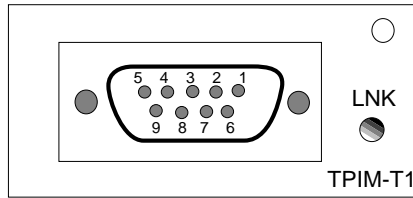
RING OUT
1. Transmit +
2. Ground
3. +5V at 250 mA
4. Ground
5. Receive -
6. Transmit -
7. Ground
8. Ground
9. Receive +

RING IN
1. Receive +
2. Ground
3. +5V at 250 mA
4. Ground
5. Transmit -
6. Receive -
7. Ground
8. Ground
9. Transmit +

Figure 2-3. TPIM-T1 Pinouts

TPIM-T2

TPIM-T2 provides an RJ45 connector that supports UTP cabling.
Figure 2-4 shows pinouts for Ring Out and Ring In applications.
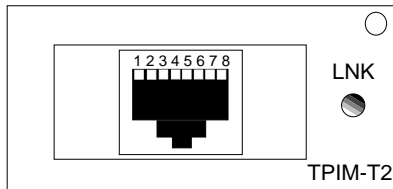
RING OUT
1. Not Used
2. Not Used
3. Receive -
4. Transmit +
5. Transmit -
6. Receive +
7. Not Used
8. Not Used

RING IN
1. Not Used
2. Not Used
3. Transmit -
4. Receive +
5. Receive -
6. Transmit +
7. Not Used
8. Not Used

Figure 2-4. TPIM-T2 Pinouts

TPIM-T4

TPIM-T4 is an RJ45 connector that supports STP cabling. Figure 2-5
shows pinouts for Ring Out and Ring In applications.
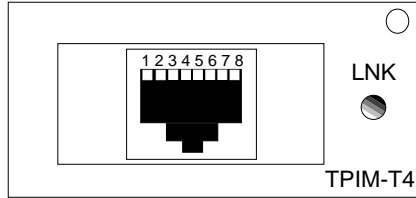
RING OUT
1. Not Used
2. Not Used
3. Receive -
4. Transmit +
5. Transmit -
6. Receive +
7. Not Used
8. Not Used

RING IN
1. Not Used
2. Not Used
3. Transmit -
4. Receive +
5. Receive -
6. Transmit +
7. Not Used
8. Not Used

Figure 2-5. TPIM-T4 Pinouts

TPIM-F2

TPIM-F2, shown in Figure 2-6, provides an ST connector that supports Multimode fiber Optic cabling.
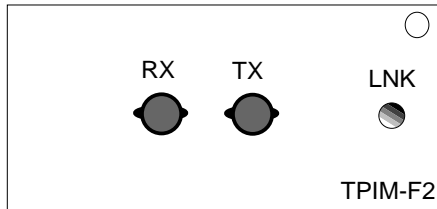
Figure 2-6. TPIM-F2

NOTE: Transmitter power and receive sensitivity levels, shown in Table 2-8, are Peak Power Levels after optical overshoot. A Peak Power Meter must be used to correctly compare the values given to those measured on any particular port. If power levels are being measured with an Average Power Meter, then 3 dBm must be added to the measurement to correctly compare those measured values to the values listed (i.e. -30.5 dBm peak=-33.5 dBm average).

Table 2-8.   TPIM-F2 Specifications.

Parameter	Typical Value	Worst Case	Worst Case Budget	Typical Budget
Receive Sensitivity	-30.5 dBm	-28.0 dBm	—	—
Peak Input Power	-7.6 dBm	-8.2 dBm	—	—
Transmitter Power:				
50/125 µm	-13.0 dBm	-15.0 dBm	13.0 dB	17.5 dB
62.5/125 µm	-10.0 dBm	-12.0 dBm	16.0 dB	20.5 dB
100/140 µm	-7.0 dBm	-9.0 dBm	19.0 dB	23.5 dB
Error Rate: Better than 10^{-10}				

TPIM-F3

TPIM-F3, shown in Figure 2-7, is an ST connector that supports Single Mode fiber Optic cabling.
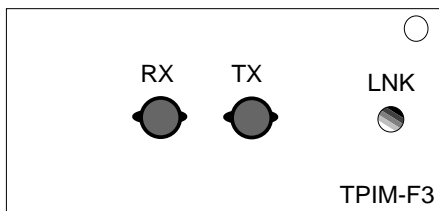
Figure 2-7.   The TPIM-F3

Table 2-9.   TPIM-F3 Specifications

Parameter	Typical	Minimum	Maximum
Transmitter Peak Wave Length	1300 nm	1270 nm	1330 nm
Spectral Width	60 nm	–	100 nm
Rise Time	3.0 nsec	2.7 nsec	5.0 nsec

Table 2-9.   TPIM-F3 Specifications

Parameter	Typical	Minimum	Maximum
Fall Time	2.5 nsec	2.2 nsec	5.0 nsec
Duty Cycle	50.1%	49.6%	50.7%
Bit Error Rate: Better than 10^{-10}			

NOTE: Transmitter Power decreases as temperatures rise and increases as temperatures fall. Use the Output Power Coefficient to calculate increased or decreased power output for an operating environment. For example, the typical power output at 25°C is -16.4 dBm.

For a 4°C temperature increase, multiply the typical coefficient (-0.15 dBm) by four and add the result to typical output power (4 x -0.15 dBm + -16.4 = -17.0).
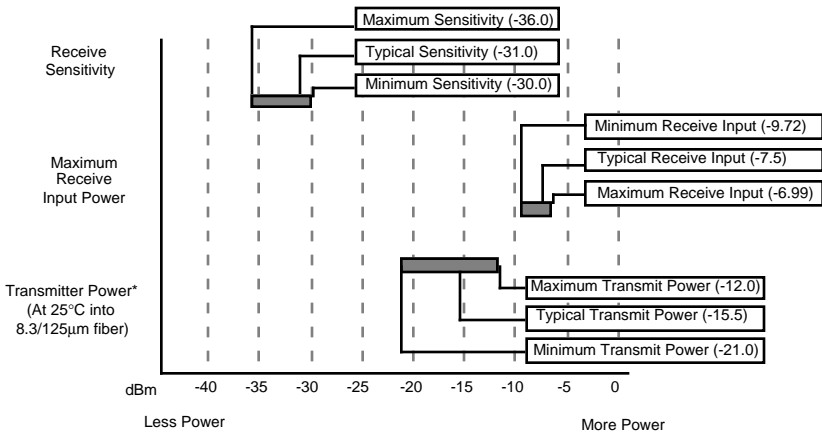
NOTE: The transmitter power levels provided above are Peak Power Levels after optical overshoot. Use a Peak Power Meter to correctly compare the values given to those measured on any particular port.

When measuring power levels with an Average Power Meter, add 3 dBm

to the average power measurement to correctly compare the average power values measured to the values listed above (i.e., -33.5 dBm average + 3 dB = -30.5 dBm peak).

2.5 GENERAL SPECIFICATIONS

Cabletron Systems reserves the right to change the following operating specifications at any time without notice:

- Data Buffer Memory (RAM): 8 MB (Upgradeable)

- Internal Processor: Intel 80C960CF at 24 MHz

- Controller: Texas Instruments TMS380C26

- Static RAM: 128 KB with battery back-up

- EPROM: 128 KB

- FLASH MEMORY: 2 MB (Upgradeable)

2.5.1 Power Supply Requirements

NOTE: The MicroMMAC-T has a universal power supply which will accept input power between 85 and 264 VAC, 47-63 Hz.

The power supply has two outputs of +5 volts and +12 volts. Maximum output power is 125 watts and the minimum efficiency is 65% under all conditions of line at full load. The minimum and maximum load current from each output is shown below.

Table 2-10.

Output	Min. Load	Max. Load	Max Power
+ 5 Volts	1.00 Amps	15 Amps	75 Watts
+12 Volts	0.15 Amps	4 Amps	48 Watts

2.5.2 Environmental Requirements

Operating Temperature: +5° to +50°C

Non-operating Temperature: -30° to +90°C

Operating Humidity: 5 to 95% (non-condensing)

2.5.3 Safety

This unit meets the safety requirements of UL 1950, CSA C22.2 No. 950 and EN 60950; the EMI requirements of FCC Class A and EN 55022 Class A; and the EMC requirements of EN 50082-1.

WARNING: It is the responsibility of the system vendor to ensure that the total system, including the MicroMMAC-T, meets allowed limits of conducted and radiated emissions.

2.5.4 Physical

Dimensions:

    2.8H x 17.0W x 13.5D inches
    (7.2H x 43.6W x 34.6D cm)

Weight:

    Unit: 7 pounds
    Shipping: 11 pounds

2.5.5 Service

MTBF   >944,197 hours projected

MTTR   <0.5 hour

CHAPTER 3

INSTALLATION

This chapter outlines MicroMMAC-T installation and network connection procedures. Be sure that the network meets the guidelines and requirements outlined in Chapter 2, **Requirements/Specifications**, before installing the MicroMMAC-T.

3.1 UNPACKING THE MicroMMAC-T

Unpack the module carefully. Preserve and save all packaging materials for possible storage or transport of the MicroMMAC-T.

Thoroughly inspect the MicroMMAC-T immediately. If there are any signs of damage to the module, contact Cabletron Systems Technical Support immediately.

3.2 ATTACHING THE STRAIN RELIEF BRACKET

Attach the strain relief bracket to the front of the MicroMMAC-T as described:

1. From the MicroMMAC-T installation kit, locate the strain relief bracket (shown in Figure 3-1) and four 8-32 x 3/8" screws.

CAUTION: Use of longer screws may cause damage to the unit or electrical shock.

2. Attach the strain relief bracket to the bottom of the MicroMMAC-T as shown in Figure 3-1.
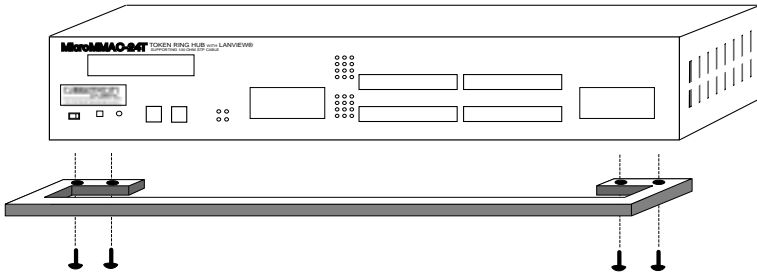
Figure 3-1. Attaching the Strain Relief Bracket

3.3 INSTALLING THE MicroMMAC-T

The MicroMMAC-T can be rack-mounted, wall-mounted, or placed on any horizontal surface. Refer to the following subsections for the appropriate installation instructions. When installing the MicroMMAC-T into something other than a 19-inch rack, installation requires the following:

- An unrestricted free surface area at least 21 inches wide, 18 inches deep, and 6 inches high.

- A single phase 85 to 264 Vac, 15A, grounded power receptacle located within 7 feet of the site.

- If a shelving unit is used, it must be able to support 30 pounds of static weight.

- The temperature in selected location must be between 5° and 50°C, and change less than 10°C per hour.

NOTE: Be sure that the selected location is within reach of the network cabling.

3.3.1 Rack-Mounting the MicroMMAC-T

Refer to Figure 3-2 and perform the following steps to install the MicroMMAC-T in a 19-inch rack:

1. Remove the four cover screws located along the front edges of each side of the MicroMMAC-T.

2. Using the four cover screws removed in step 1, attach the rack-mounting brackets to each end of the MicroMMAC-T.
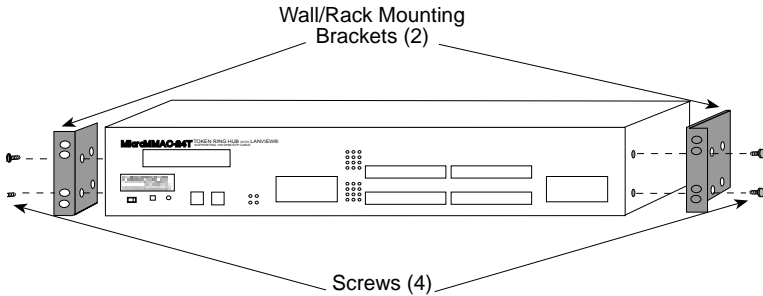
Figure 3-2. Installing of Rack-Mount Brackets

3. With the mounting brackets installed, position the MicroMMAC-T between the vertical frame members of the 19-inch rack and fasten it securely with the mounting screws (see Figure 3-3).
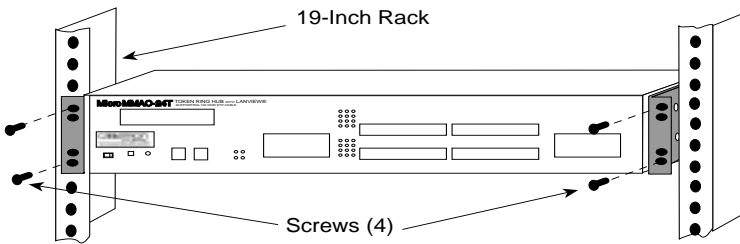
Figure 3-3. Installing the MicroMMAC-T in a 19-inch Rack

3.3.2 Wall-Mounting the MicroMMAC-T

When wall-mounting the MicroMMAC-T, the TCU ports must face downward. Perform the following steps to wall-mount the MicroMMAC-T:

NOTE: 1/4-inch Molly screw anchors for wall-mounting are not included with the MicroMMAC-T.

1. Use the supplied screws to attach the wall-mounting brackets to the bottom of the MicroMMAC-T as shown in Figure 3-4. There are two brackets, one for each side.
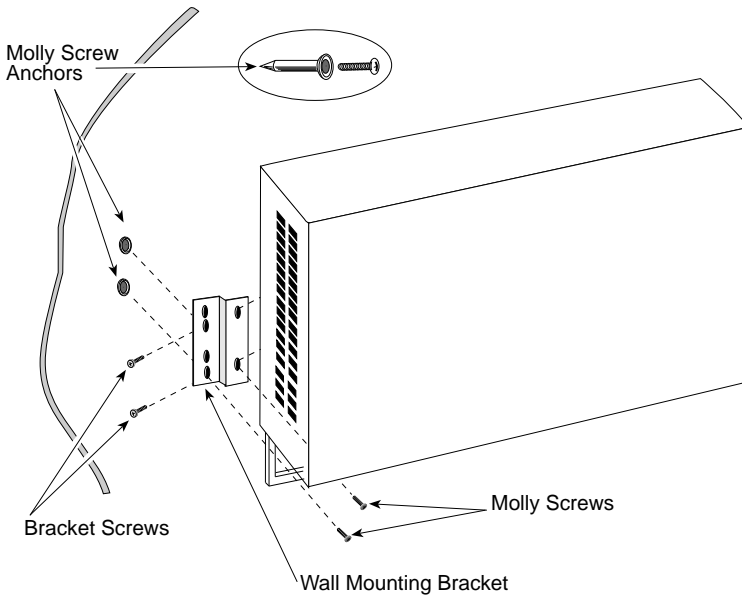
Figure 3-4. Wall-Mounting the MicroMMAC-T

2. Select a wall location within seven feet of a power outlet for the MicroMMAC-T.

*WARNING: When drilling pilot holes, any electrical wiring inside the wall may present a potential **SHOCK HAZARD**. Select a wall location accordingly.*

3. Position the MicroMMAC-T against the wall with the network port facing down. Using a pencil, mark the wall location for the four pilot holes.

4. Set the MicroMMAC-T aside and carefully drill four 1/4" pilot holes, (one for each of the Molly screw anchors) and insert the four Molly screw anchors into the holes.

5. Place a screw in each anchor, and tighten until each anchor expands firmly in the wall; then remove the screws completely.

6. Position the MicroMMAC-T on the wall over the anchors and reinstall the four screws to attach the MicroMMAC-T to the wall, as shown in Figure 3-4. Tighten the four screws.

3.3.3 Free-Standing Installation

For a free-standing shelf or table top installation, locate the MicroMMAC-T, as shown in Figure 3-5, within 7 feet of its power source on an unrestricted free surface area 21 inches wide, 18 inches deep, and 6 inches high.
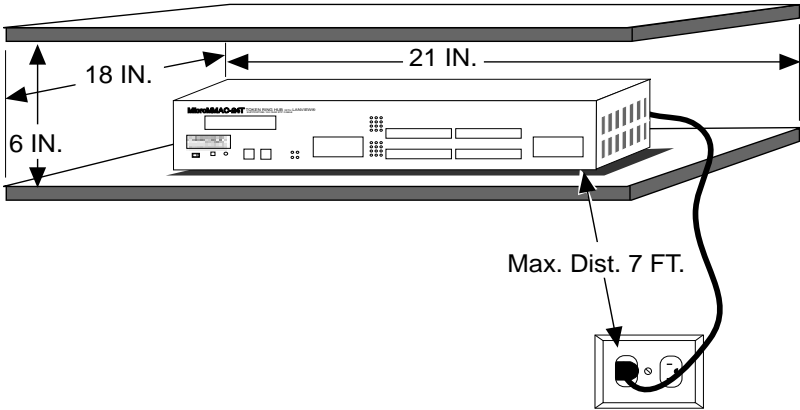
Figure 3-5. Free-Standing Installation

3.4 CONNECTING TO A POWER SOURCE

NOTE: The MicroMMAC-T has a universal power supply that allows it to use power sources from 85 Vac to 264 Vac, 47-63 Hz.

To connect the MicroMMAC-T to the power source, plug the power cord into a grounded wall outlet. After the MicroMMAC-T runs a self test, the **CPU** LED blinks green to indicate normal operation. If the LED remains red, the processor is faulty.

3.5 RESETTING THE MICROMMAC-T

The MicroMMAC-T reset button is located on the left front panel as shown in Figure 3-6.

To reset the MicroMMAC-T:

Insert a small pointed-tip object (e.g., ballpoint pen) into the recessed reset button hole, press the button once, and then release.
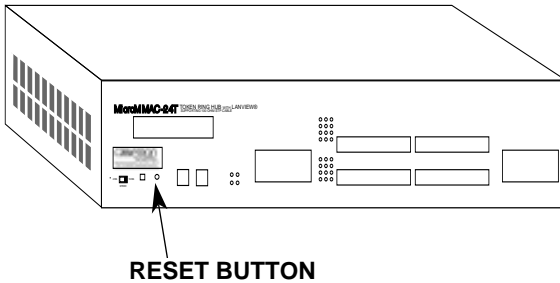
RESET BUTTON

Figure 3-6. The Reset Button

3.6 SETTING THE RING SPEED

The ring speed switch is located on the front face of the MicroMMAC-T as shown in Figure 3-7.

The MicroMMAC-T's factory-default ring speed setting is 16 Mbps.

To change the ring speed:
1. Slide the ring speed switch to the desired setting.

2. RESET the MicroMMAC-T.

3. Check that the Ring Speed LED indicates the correct setting.
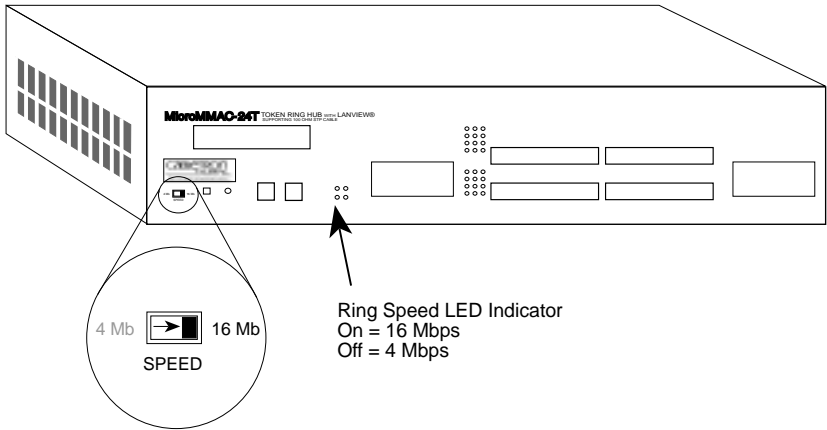
Figure 3-7. The Ring Speed Switch

3.7 SETTING THE NVRAM SWITCH

Figure 3-8 shows the location of the NVRAM Reset Switch. It can be reached by a inserting a small screwdriver through the side vent. NVRAM (Non-Volatile Random Access Memory) stores user-entered parameters such as IP address and device name.
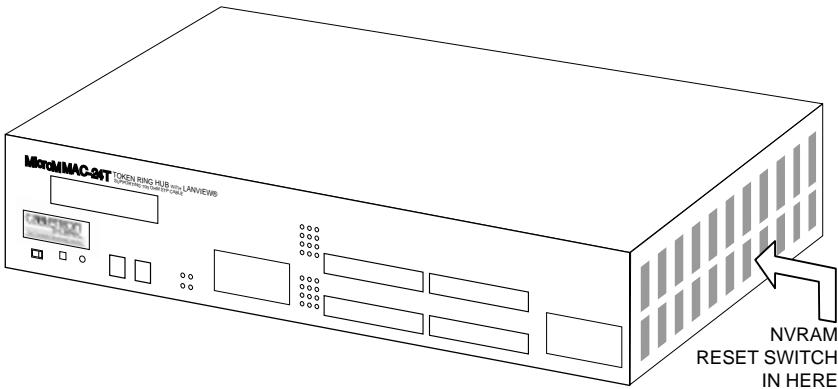
Figure 3-8. NVRAM Reset Switch Location

To restore MicroMMAC-T parameters to the factory defaults:

1. With power-ON, toggle the NVRAM switch from one position to the other.

2. Press the MicroMMAC-T's Reset button.

   Once the module is reset, use the factory-default settings or enter new parameters. The MicroMMAC-T stores these settings in NVRAM during normal operation and during power down until the reset switch is toggled again.

NOTE: Clearing and resetting NVAM does not reset the date and time.

3.8 CONNECTING LOBE PORT CABLING

The MicroMMACs 22T and 24T have unshielded RJ45 lobe ports that support UTP cabling. To connect a UTP segment from the MicroMMAC-T to a station supporting STP cabling, a Type 3 Media Filter is required. The Cabletron Systems TRMF and TRMF-2 are available for this purpose.

The MicroMMACs 42T and 44T have shielded RJ45 lobe ports that support STP cabling. Shielded patch cables that adapt a shielded RJ45 to a data connector (MIC) are available from Cabletron Systems (PN 9372057-8). These adapter/patch cables allow connection to an existing patch panel equipped with data connectors. The MicroMMAC-T's network lobe port pinouts are shown in Figure 3-9.

RJ45 Plug	to	MIC Connector

Pin 3 (Receive -) . . . . .to . . . Green (Transmit -)
Pin 4 (Transmit +). . . . . .to . . . Orange (Receive +)
Pin 5 (Transmit -) . . . . .to . . . Black (Receive -)
Pin 6 (Receive +) . . . . .to . . . Blue (Transmit +)

RJ45 Plug   **RJ45 Plug**

8 ← 1   **8 ← 1**

| **RJ45 Plug** | **to** | **RJ45 Plug** |
| **(at TCU)** | | **(at device port)** |

Pin 3 (Receive -) . . . . to. . . . Pin 3 (Transmit -)
Pin 4 (Transmit +) . . . . to. . . . Pin 4 (Receive +)
Pin 5 (Transmit -). . . . . to. . . . Pin 5 (Receive -)
Pin 6 (Receive +) . . . . to. . . . Pin 6 (Transmit +)

Figure 3-9. Network lobe pinouts

Figure 3-10 and Figure 3-11 illustrate possible MicroMMAC-T cabling
configurations.

Figure 3-10. UTP Configuration Example
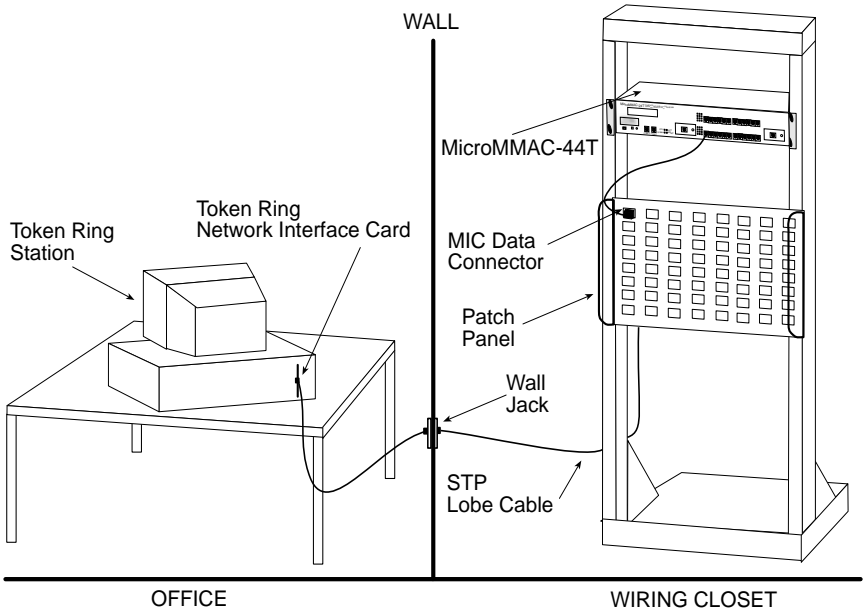
Figure 3-11. STP Configuration Example

To attach a lobe segment to a MicroMMAC-T network port:

1. Insert the RJ45 connector from each twisted pair segment into an RJ45 network lobe port on the MicroMMAC-T, as shown in Figure 3-12.
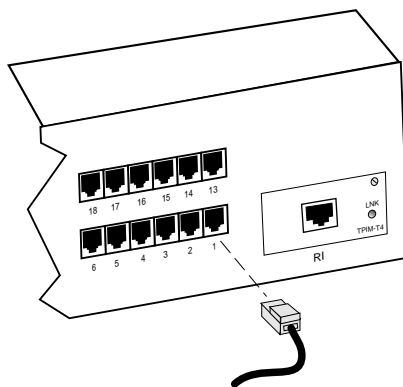
Figure 3-12. MicroMMAC-T Network Ports

2. The associated Port Status LED lights green when the station boots up. If the LED doesn't light, perform the following steps:

   a. Check that the device at the other end of the twisted pair segment has power, and that the network interface driver is initialized.

   b. Verify the RJ45 connector pinouts on the twisted pair segment.

   c. Check that the twisted pair connection meets the dB loss limits and cable specifications outlined in Chapter 2.

   d. Check Local Management to ensure that the port is enabled.

   e. If a link still can not be established, contact Cabletron Systems Technical Support.

3.9 INSTALLING TPIM MODULES

TPIMs provide specialized RI/RO ports for trunk connections. Each TPIM supports a different medium (cable type). Different TPIMs may be operated together: for example, a TPIM-T1 can provide a Ring-In port while a TPIM-T4 provides a Ring-Out port.

The following sub-sections explain how to set the Phantom and RI/RO Switches, how to install a TPIM into a MicroMMAC-T, and how to attach network segments through the TPIM.

Prior to connecting trunk cabling to the TPIMs, check the connectors for proper pinouts. Table 3-1 provides a cross-reference of pinouts for TPIMs used for Ring-In or Ring-Out applications.

Table 3-1. Pinout Cross-Reference for TPIMs

Signal	TPIM-T2/T4 (RJ45) Ring-In	TPIM-T2/T4 (RJ45) Ring-Out	TPIM-T1 (DB9) Ring-In	TPIM-T1 (DB9) Ring-Out
TX+	6	4	9	1
TX-	3	5	5	6

Table 3-1.   Pinout Cross-Reference for TPIMs (Cont.)

Signal	TPIM-T2/T4 (RJ45) Ring-In	TPIM-T2/T4 (RJ45) Ring-Out	TPIM-T1 (DB9) Ring-In	TPIM-T1 (DB9) Ring-Out
RX+	4	6	1	9
RX-	5	3	6	5

3.9.1 Setting Phantom and RI/RO Switches

The Phantom Switch (shown in Figure 3-13) enables the port to "autowrap" if a trunk cable fails or is removed. The Phantom Switch should be set to the appropriate setting before TPIM installation. When attaching a Cabletron hub to the TPIM, leave the switch at the factory default setting of 1. When attaching a non-Cabletron device to the TPIM, such as an IBM 8228 MAU, use the 0 setting.

Ensure that the Ring-In/Ring-Out Switch is in the factory default RI/RO position. The MicroMMAC-T does not support the Station (S) setting.

NOTE: If the switch locations on the TPIM do not match the locations illustrated in Figure 3-13, refer to the TPIM Reference Card included with the TPIM. The TPIM Reference Card outlines switch locations and settings. For additional help, call Cabletron Systems Technical Support.

Top View

TPIM-T1/TPIM-T2/TPIM-T4

TPIM-F2/TPIM-F3

Phantom Switch Settings
1 = Cabletron Device (Default)
0 = Non-Cabletron Device

RI/RO Switch Settings
RI/RO = Ring In/Ring Out (Default)
S = Station (Not Functional)

RI/RO Switch Settings
RI/RO = Ring In Ring Out (Default)
STN = Station (Not Functional)
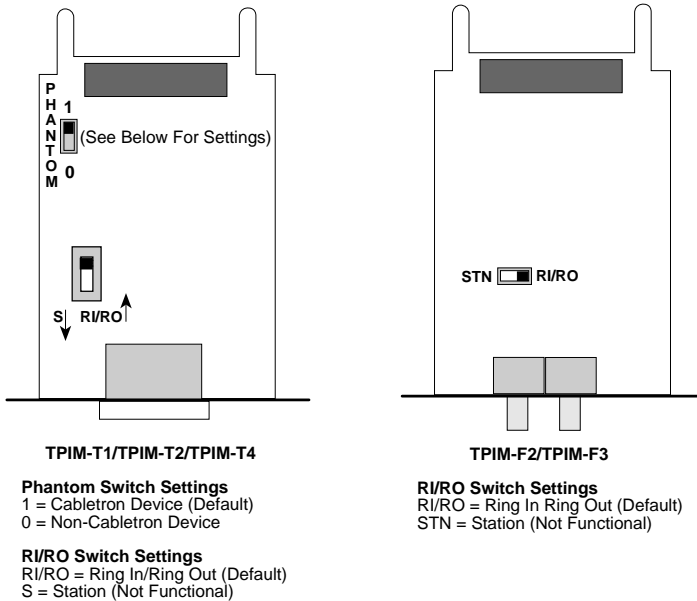
Figure 3-13. The Phantom and RI/RO Switches

3.9.2 TPIM Installation

To install a TPIM, perform the following steps:

CAUTION: Observe all static precautions while handling TPIMs.

3. Remove the mounting screw from the faceplate of the RI/RO port on the MicroMMAC-T.

4. If replacing a TPIM, remove the mounting screw and pull the TPIM straight out from the MicroMMAC-T.

5. Slide the new TPIM into place as shown in Figure 3-14.

6. Ensure proper mating between the connectors on the rear of the module and on the inside of the MicroMMAC-T.

7. Reinstall the mounting screw.
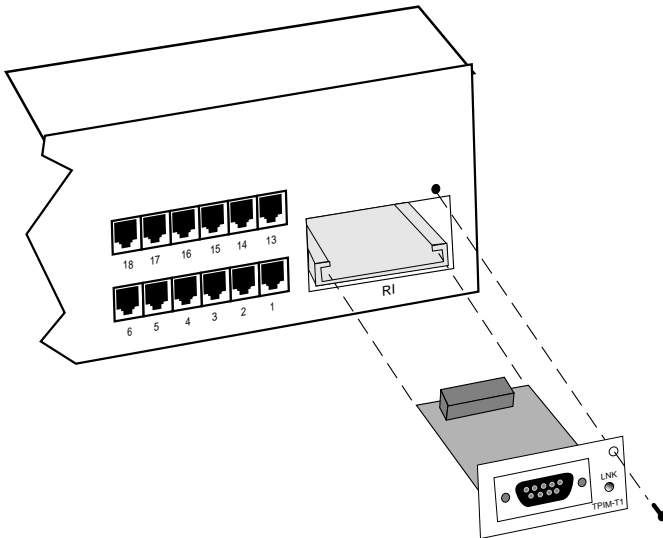
Figure 3-14. Installing a TPIM

3.9.3 Connecting STP Segments

Use TPIM-T1 to connect STP segments. Before connecting a segment to the TPIM-T1, confirm proper pinouts at each end of the segment.

To connect a TPIM-T1 to a Twisted Pair Segment:

1.   Insert the DB9 connector on the segment into the DB9 port on the TPIM as shown in Figure 3-15.
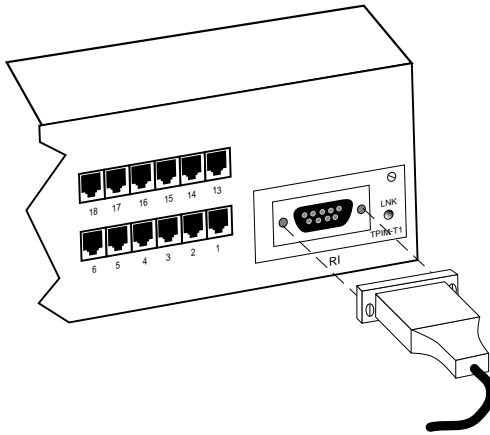
Figure 3-15. The TPIM-T1

2. Check that the **LNK** LED on the TPIM lights green. If the LED is red
    or is not lighted, perform each of the following steps:

    a. Check that the device at the other end of the segment has power.

    b. Verify that the DB9 connector is pinned properly.

    c. Check that the twisted pair connection meets dB loss limits and
        cable specifications outlined in Chapter 2.

    d. Check that the port is enabled through the Local Management.

    e. If a link still cannot be established, contact Cabletron Systems
        Technical Support.

3.9.4 Connecting Twisted Pair Segments

The TPIM-T2 supports UTP cabling and the TPIM-T4 supports STP
cabling. Both devices use the same method for connecting an RJ45
connector to an RJ45 port. Before connecting a segment to the TPIM-T2
/T4, check each end of the segment to ensure the wires are pinned properly.

To connect a segment to a TPIM-T2/-T4:

1. Insert the RJ45 connector on the twisted pair segment into the RJ45
    port on the TPIM as shown in Figure 3-16.

Figure 3-16. The TPIM-T2/-T4

2. Check that the **LNK** LED on the TPIM lights green. If the LED lights red or is not lit, perform each of the following steps:

    a. Check that the device at the other end of the segment has power.

    b. Verify that the RJ45 is pinned properly.

    c. Check that the twisted pair connection meets dB loss limits and cable specifications outlined in Chapter 2.

    d. Check that the port is enabled through Local Management.

    e. If a link still can not be established, contact Cabletron Systems Technical Support.

3.9.5 Connecting Fiber Optic Link Segments

Use TPIMs -F2/ -F3 to connect Fiber Optic Link segments. When connecting a fiber optic link segment to the TPIM-F2 or TPIM-F3 consider the following:

•   Fiber optic link segments with ST connectors attach to ST ports much like BNC connectors attach to BNC ports. The connector is inserted into the port with the alignment key on the connector inserted into the alignment slot on the port. The connector is then turned to lock it down.

- The physical communication link consists of two strands of fiber optic cabling. The Transmit strand (TX) at one end connects to the Receive (RX) port at the other end and vice versa.

- Cabletron Systems labels its fiber optic cable to indicate which fiber is Receive and which is Transmit: one fiber is labeled 1, and the other fiber is labeled 2. If using a non-Cabletron cable, labeling in the above manner is recommended.

CAUTION: Do not touch the ends of the fiber optic strands. Dust, dirt, and other contaminants on the ends of the strands create data transmissions problems. If the ends become dirty, clean them with alcohol using a soft, clean, lint free cloth.

To connect a fiber optic link segment to the TPIM-F2 /-F3:

1. Remove the protective plastic covers from the appropriate fiber optic ports on the module and from the ends of the connectors on each fiber strand.

2. As shown in Figure 3-17, attach the fiber labeled 1 to the module's receive port (labeled **RX**) and attach the fiber labeled 2 to the module's transmit port (labeled **TX).**
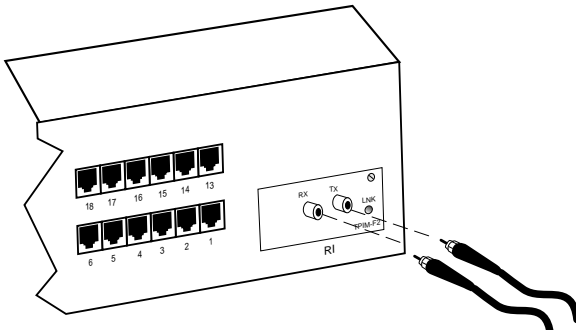
Figure 3-17. The TPIM-F2/-F3

3. At the other end of the fiber optic cable, attach the fiber labeled 1 to the transmit port of the device and attach the fiber labeled 2 to the receive port.

4. Check that the **LNK** LED on the TPIM lights green. If the LED does not light, perform each of the following steps:

a. Check that the device at the other end of the link has power.

b. Verify that the fiber strands are properly "crossed-over" between the ports on the module and on the fiber optic device at the other end of the fiber optic link segment.

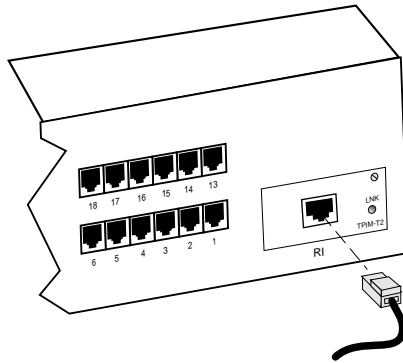c. Verify that the fiber connection meets the dB loss limit specifications outlined in Chapter 2.

d. Check that the port is enabled through MicroMMAC-T Local Management.

e. If a link still can not be established, contact Cabletron Systems Technical Support.

3.10 CHECKING THE INSTALLATION

To check MicroMMAC-T installation:

1. Trace the ring path through the network to be sure that there are no breaks in the ring and that it is free from logical design errors.

    a. Check that each cable connection is secure and logically correct.

    b. Verify the pinouts for each connection.

    c. Use a cable tester to check the cable conductors for continuity.

2. Check that all devices operating on the same network are set to the same ring speed.

3. Ensure that the maximum number of stations is not exceeded.

4. Ensure that the maximum cable length to each station is not exceeded.

5. Ensure that the networking software is configured properly to match the installed network.

When these checks are successfully cleared, the MicroMMAC-T is ready for normal operation. If errors or other problems are encountered, see Chapter 5, Troubleshooting, for information about diagnosing operational problems.

If problems still occur, contact your Cabletron Technical Support representative.

CHAPTER 4

LOCAL MANAGEMENT

This chapter explains how to set up a management terminal and a modem to access MicroMMAC-T's Local Management (LM). It also explains how to use Local Management tools to manage the MicroMMAC-T, its components, and its attached segments (i.e., BRIMs, MicroSNAC).

Use Local Management to Do the Following:
- Control password access to the MicroMMAC-T

- Change factory defaults

- Enable and disable ports

- Ensure ring security by controlling access to the Token Ring network

- Assign an IP address and subnet mask

- Set interface parameters for serial ports, Local Management (LM), Serial Line Internet Protocol (SLIP), Uninterrupted Power Supply (UPS), and Telnet

- Designate which Network Management Stations (NMS) receive traps from the device

- Navigate through the Management Information Base (MIB) and manage the objects within it

4.1 MANAGEMENT TERMINAL REQUIREMENTS

To access Local Management, use one of the following management terminals:

- Digital Equipment Corporation VT series terminal

- VT type terminal running emulation programs for the Digital Equipment Corporation VT series

- IBM or compatible PC running a VT series emulation software package

Cabletron supplies an RJ45 Cable Kit with the MicroMMAC-T. This kit includes a UTP console cable with RJ45 connectors on each end. It also provides adapters for DB9 or DB25 connections. Refer to the RJ45 Cable Kit Instruction Sheet for adapter pinouts and additional instructions.

The following sections explain how to attach the console cable to the management terminal.

4.1.1 Attaching the Management Terminal

NOTE: To view booting and diagnostic test information during power-up or reset, connect the terminal to the MicroMMAC-T 's COM 2 port. See Section 5.3 for more information about POWER UP DIAGNOSTIC tests.

To attach a management terminal to the MicroMMAC-T:

1. Attach the connecting cable's male RJ45 connector to either the COM 1 port or the COM 2 port on the MicroMMAC-T as shown in Figure 4-1.

2. Attach the female end (25-pin or 9-pin) to the COM port on the terminal.
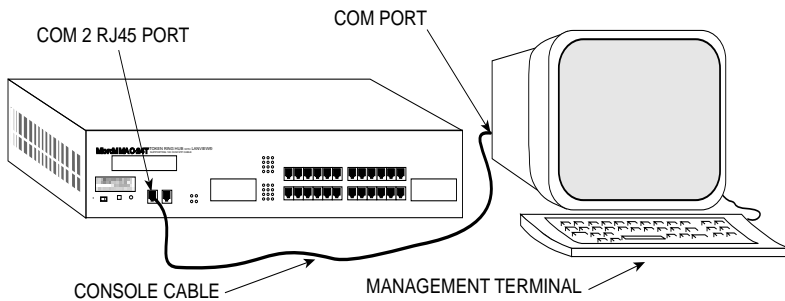
Figure 4-1. Management Terminal Connection

4.1.2 Management Terminal Setup Parameters

Table 4-1 lists the setup parameters for the Local Management terminal. If you are using a Digital Equipment Corporation VT terminal, press **F3** to access the Setup Directory. For PC emulations of VT terminals, refer to the emulator's documentation for setup parameters.

When you have finished attaching and setting up the terminal, you can access Local Management.

Table 4-1.   Terminal Settings for LM Terminal

Menu	Function	Selection
Display Setup	Columns	80 Columns
	Controls	Interpret Controls
	Auto Wrap	No Auto Wrap
	Text Cursor	Cursor
General Setup	Mode	VT 100, 7 bit control
	Cursor Keys	Normal Cursor Keys
Communications Setup	Transmit	Transmit = 9600
	Receive	Receive = Transmit
	Bits, Parity	8 Bits, No Parity
	Stop Bit	1 Stop Bit
	Local Echo	No Local Echo
	Port	Data Leads Only
	Auto Answerback	No Auto Answerback
Keyboard Setup	Keys	Typewriter Keys
	Margin Bell	Margin Bell
	Warning Bell	Warning Bell
	Auto Answerback	No Auto Answerback

4.1.3 Modem Cable Configuration and Setup

To access Local Management from a modem, use an RS-232 cable available from Cabletron Systems. This cable connects the modem to the

MicroMMAC-T's COM 2 port. Figure 4-2 shows the pinout for a cable with an RJ45 connector at the MicroMMAC-T end of the cable.

Pin 1

RJ45 COM 2 PORT

RJ45 TO 25-PIN CABLE

RJ45   COM 2 Port

25-Pin Female "D" Shell Connector

RJ45 COM 2 Port	Pin		Pin	25-Pin Female
TRANSMIT	1		2	TRANSMIT
RECEIVE	4		3	RECEIVE
SIGNAL GROUND	5		7	SIGNAL GROUND
DATA CARRIER DETECT	2		8	DATA CARRIER DETECT
DATA TERMINAL READY	6		20	DATA TERMINAL READY
RING	8		2	RING
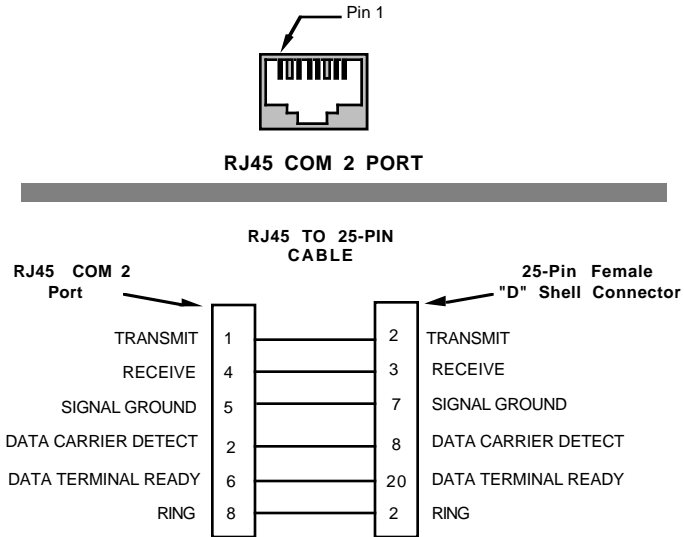
Figure 4-2. Modem Cable Pinouts

4.2 ACCESSING LOCAL MANAGEMENT

To access Local Management:

1. Turn on the display terminal and then press the **Return key**.

    The MicroMMAC-T Local Management screen (Figure 4-3) appears.

```
                    uMMAC-T Local Management


               CABLETRON Systems, Incorporated
                        P.O. Box 5005
               Rochester, NH  03867-5005   USA
                       (603)  332-9400

       (c) Copyright CABLETRON Systems, Inc. 1995



       Device Model Number: 00.00.01
             Serial Number: 00.00.01
       Functionality Level: 00.00.01
       Flash Image Version: 01.00.01
          BOOTPROM Version: 01.00.01
            Board Revision: 00.00.01


            Enter Password:_____
```

Figure 4-3. MicroMMAC-T Local Management Screen

2. Enter the Password (the factory default password is the **Return key**)
    and then press the **Return key**.

    If your password is invalid, the cursor returns to the beginning of the
    password field; otherwise, the MAIN MENU screen appears.
    Figure 4-4 shows the MAIN MENU screen at the top of the
    representational screen-access hierarchy.

*NOTE: Your password is one of the community names specified in the
Community Name Table. Access to certain Local Management tools
depends on the degree of access accorded that community name. See
Section 4.3.3 for more information about community names.*

4.2.1 Accessing Local Management via Telnet

Once the MicroMMAC-T is given a valid IP address (see Section 4.3.2 for
information on setting an IP address), you can establish a Telnet session
with Local Management from any TCP/IP based node on the network.

4.2.2 Accessing Local Management from a Modem

1. Turn on the modem. The modem must be set for Auto Answer and Data Carrier Detect must be active. Refer to your modem's user manual for operating instructions.

2. Call the modem.

    The MicroMMAC-T Local Management screen appears when you establish a connection (Figure 4-3).

4.3 USING LOCAL MANAGEMENT

The MENU screens, shown in Figure 4-4, provide access to all MicroMMAC-T Local Management tools:

*   MAIN MENU Screen

*   SETUP MENU Screen

*   STATUS MENU Screen

MAIN MENU Screen

The MAIN MENU screen is the gateway to all other Local Management MENU screens and the tools they provide. It also lets you access the DEVICE STATISTICS and Management Information Base (MIB) NAVIGATOR screens.

SETUP MENU Screen

Selections from the SETUP MENU screen let you setup and manage system parameters, establish community names, designate traps, download Flash images and establish ring security privileges.

STATUS MENU Screen

Selections from the STATUS MENU screen let you control access to MicroMMAC-T ports and monitor chassis and component functions.
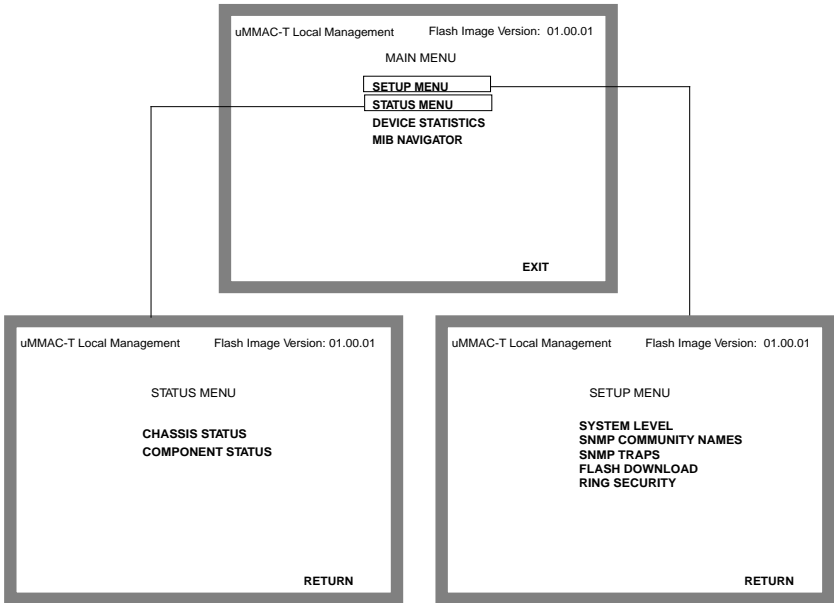
Figure 4-4. Local Management MENU Screens Hierarchy

NOTE: Local Management automatically disconnects after 15 minutes of keyboard inactivity. To prevent disconnection, press any key during periods of inactivity. If you are disconnected, just press Return to re-access the LM password screen.

4.3.1 Working with Local Management Screens

This section describes how to work with all LM screens.

Selecting a MENU Screen Option

1. Use the **Tab key** or **arrow keys** to highlight a MENU option.

2. Press the **Return key**.

   The selected screen appears.

Setting or Modifying Local Management Screen Fields

Local Management screen lets you set or modify and then save system fields, or parameters, singularly or globally. Use the following procedures

(or other procedures where they are described) when working with LM screens:

1. Use the **Tab key** or **arrow keys** to highlight the parameter(s).

2. Use the **spacebar** to toggle through settings for fields offering selections; type settings over fields that you can edit or type over.

3. Highlight the **SAVE** command at the bottom of the screen after setting parameters and then press the **Return key.**

    The "SAVED" message appears on the screen indicating that your change(s) have been saved to memory.

    If you decide to exit the screen without saving your changes, the "NOT SAVED-PRESS SAVE TO KEEP YOUR CHANGES" appears on the screen.

Exiting a Local Management Screen

1. Use the **Tab key** or **arrow keys** to highlight the **RETURN** command at the bottom of the screen.

2. Press the **Return key**.

    Local Management returns you to the previous MENU screen.

Exiting Your Local Management Session

1. Use the **Tab key** or **arrow keys** to highlight the **RETURN** command at the bottom of the screen.

2. Repeat Step 1., if necessary, until you arrive at the MAIN MENU screen.

3. Use the **Tab key** or **arrow keys** to highlight the **EXIT** command at the bottom of the MAIN MENU screen.

4. Press the **Return key**.

    The Local Management screen disappears.

The remainder of this chapter describes Local Management screens and how to use the tools they provide.

4.3.2 The SYSTEM LEVEL Screen

The SYSTEM LEVEL Screen (Figure 4-5) displays and lets you set the following parameters:

- IP Address,

- Subnet Mask

- System Date

- System Time

- Default Gateway

- Beacon Recovery

- COM Port Applications

It also displays the Physical MAC device address and the Default Interface.

```
uMMAC-T Local Management                    Flash Image Version: 01.00.01

                            SYSTEM LEVEL

System Date: 09/23/94                          System Time: 12:23:57

Host IP Address    Subnet Mask      Default Interface   Default Gateway
xxx.xxx.xxx.xxx    xxx.xxx.xxx.xxx    NONE DEFINED       NONE DEFINED

COM 1 Application: [LM]
COM 2 Application: [LM]

                        Beacon Recovery [ ENABLED ]
                        Number of Retries(000-100,999-infinite):004
                                        Retry Interval(000-999):021



        Physical MAC Address:              00-00-B8-28-08-54
        Local Admin Addr [ DISABLED ]:     40-00-00-00-00-00

   SAVE                                                          RETURN
```

Figure 4-5. SYSTEM LEVEL Screen

The following sections describe SYSTEM LEVEL screen fields, their functions, and where applicable, how to use them.

Setting the System Date

Use this field to set the correct date.

1. Highlight the System Date field.

2. Type the date into the field in a MM/DD/YY format and then press the **Return key**.

3. If the format is invalid, the message "INVALID DATE" appears. Re-type the date using the correct format.

4. If the format is correct, highlight the **SAVE** command and press the **Return key**.

   The "SAVED" message appears on the screen indicating that your change have been saved to memory.

Setting the System Time

Use this field to set the correct time.

1. Highlight the System Time field.

2. Type the time into the field in a HH:MM:SS format and then press the **Return key**.

3. If the format is invalid, the message "INVALID TIME" appears. Re-type the time using the correct format.

4. If the format is correct, highlight the **SAVE** command and then press the **Return key**.

   The "SAVED" message appears on the screen indicating that your changes have been saved to memory.

Setting the Host IP Address

Use this field to set the Internet Protocol (IP) address for the MicroMMAC-T.

NOTE: Only a user with Super-User access can change the device's IP address See Section 4.3.3 for information about Super-User access.

1. Highlight the IP Address field.

2. Type the IP Address into the field. The correct format for this entry is XXX.XXX.XXX.XXX, with values of XXX ranging from 0-255.

   If the format is invalid, the message "INVALID IP FORMAT" appears. Retype the IP Address using the correct format.

3. Press the **Return key**.

   The new value appears in the IP Address field.

4. If the IP Address is correct, highlight the **SAVE** command and then press the **Return key**.

   The "SAVED" message appears on the screen indicating that your changes have been saved to memory.

   The MicroMMAC-T will then do a soft reset.

Modifying the Subnet Mask

NOTE: Consult your Network Administrator prior to setting the Subnet Mask.

Subnets are logical divisions of the network that serve to isolate groups of devices. The Subnet Mask determines how the MicroMMAC-T directs SNMP Trap messages (see Section 4.3.4 for information about SNMP Traps) to a destination address. The MicroMMAC-T directly addresses destinations within its own subnet. The MicroMMAC-T sends messages destined for other subnets to a router.

- Use the Subnet Mask factory default setting, 0.0.0.0, when the workstations designated to receive trap messages exist within the same subnet as the MicroMMAC.

- Set a new value for the Subnet Mask when workstations designated to receive traps reside on a different subnet (that is, across a gateway or router).

To modify the Subnet Mask:
1. Highlight the Subnet Mask field.

2. Type the Subnet Mask into the field. The format for this entry is XXX.XXX.XXX.XXX, with values of XXX ranging from 0-255.

3. Press the **Return key**.

   If the format is not valid, the "INVALID IP FORMAT" message appears. Retype the Subnet Mask using the correct format.

4. If the format is correct, highlight the **SAVE** command and then press the **Return key**.

The "SAVED" message appears on the screen indicating that your changes have been saved to memory.

The MicroMMAC-T will then do a soft reset.

Setting the Default Gateway

The Default Gateway is the IP address of the network connection (e.g., external router) used in forwarding management information from the MicroMMAC-T (e.g., SNMP traps) to a network management station. Use the Default Gateway in conjunction with the Subnet Mask.

To set the Default Gateway:

1. Highlight the Default Gateway field.

2. Type the Gateway's IP address into the field. The format for this field is XXX.XXX.XXX.XXX with values for XXX ranging from 0 to 255.

3. Press the **Return key**.

   If the format is invalid, the message "INVALID IP FORMAT" appears. Re-type the IP Address using the correct format.

4. If the format is correct, highlight the **SAVE** command and then press the **Return key**.

   The "SAVED" message appears on the screen indicating that your changes have been saved to memory.

   The MicroMMAC-T will then do a soft reset

Setting Automatic Beacon Recovery Process (ABRP) Fields

Beaconing is part of a standard IEEE 802.5 Token Ring process by which a Token Ring LAN attempts to recover from cable or hardware problems by automatically locating and bypassing the fault, thereby restoring network communications without operator intervention. If the standard process fails, beaconing can disable a token ring network. Cabletron's ABRP protects against such network stoppages.

NOTE: ARBP is supported only by Cabletron products.

The ABRP is automatically invoked whenever a Token Ring network component problem creates a beaconing condition, and it is often able to correct the problem before the standard IEEE process begins. Once the

ABRP locates the problem and corrects it, the MicroMMAC-T generates traps to provide the network's designated remote management station with information regarding the incident, including:

- The beaconing device's address

- The address of the beaconing device's Nearest Active Upstream Neighbor (NAUN)

- The beacon type

- The port(s) and/or modules left in bypass

- The duration of the beaconing condition

NOTE: To prevent users from re-inserting a faulty station that could bring the network down, all objects identified as faulty and disabled by ABRP will remain disabled until a network manager repairs the fault and re-enables the object.

The MicroMMAC-T provides the following ABRP management fields:

- Beacon Recovery

- Number of Retries

- Retry Interval

The **Beacon Recovery** field indicates the current status of the ABRP at the device. The ABRP occurs for the MicroMMAC-T ports and STH ports under MicroMMAC-T control only. **ENABLED** is the default setting in this field and indicates that the ABRP is currently active at the device; **DISABLED** indicates that the ABRP is inactive at the device.

The **Number of Retries** field displays and lets you modify the number of times you want the MicroMMAC-T to try to re-enable a disabled port from which a beaconing condition was detected. The default number of retries is **4**. You can enter values from the range specified in the parentheses (000-100, 999: infinite).

The **Retry Interval** field displays and lets you modify the time delay (in increments of 7 seconds) between ring port retry attempts. The default setting is **21**.

To set the Beacon Recovery field:

1. Highlight the Beacon Recovery field

2. Toggle between **ENABLED** and **DISABLED** to make your selection.

3. Highlight the **SAVE** command and then press the **Return key**.

   The "SAVE" message appears on the screen indicating that your selection was saved to memory and the new value of the field takes effect.

To set the Number of Retries field:

1. Highlight the **Number of Retries** field and type in an allowed value.

2. Highlight the **SAVE** command and then press the **Return key.**

   The "SAVE" message appears on the screen indicating that your selection was saved to memory and the new value of the field takes effect.

To set the Retry Interval field:

1. Highlight the **Retry Interval** field and type in an allowed value (in increments of 7 only).

2. Highlight the **SAVE** command and then press the **Return key**.

   The "SAVE" message appears on the screen indicating that your selection was saved to memory and the new value of the field takes effect.

Setting COM 1 and COM 2 Applications

You can select COM port settings for LM, SLIP, UPS, Telnet, or a modem.

1. Highlight the **COM** port field and toggle to selection.

2. Highlight the **SAVE** command and then press the **Return key**.

   The "SAVE" message appears on the screen indicating that your selection was saved to memory and the new value of the field takes effect.

4.3.3 The SNMP COMMUNITY NAMES Screen

Use the SNMP COMMUNITY NAMES (Figure 4-6) screen to establish SNMP community names for the MicroMMAC-T. Community names

serve two purposes: they act as passwords to Local Management (LM) and control SNMP management access to the MicroMMAC-T.

You control MicroMMAC-T access by establishing access policy privileges at three increasingly higher levels of security:

- **Read-Only**: The user can view any LM fields not limited exclusively to Super-User privileges, but cannot make any changes.

- **Read-Write**: The user can view all LM fields and can edit **all but** the following fields: IP address, Subnet Mask, Community Name, and Ring Security.

- **Super-User**: The user can view and edit all LM fields, including community names which serve as Local Management passwords, all SNMP objects, and IP addresses.

If a user who lacks proper authorization attempts to edit a field, the following message appears: "AUTHORIZATION PROHIBITS ACCESS".

CAUTION: Community Names are passwords to Local Management. Remember your Community Name.

```
   uMMAC-T Local Management                Flash Image Version: 01.00.01

                         SNMP COMMUNITY NAMES




              Community Name                Access Policy

              public                        read-only
              public                        read-write
              public                        super-user






      SAVE                                                      RETURN

```
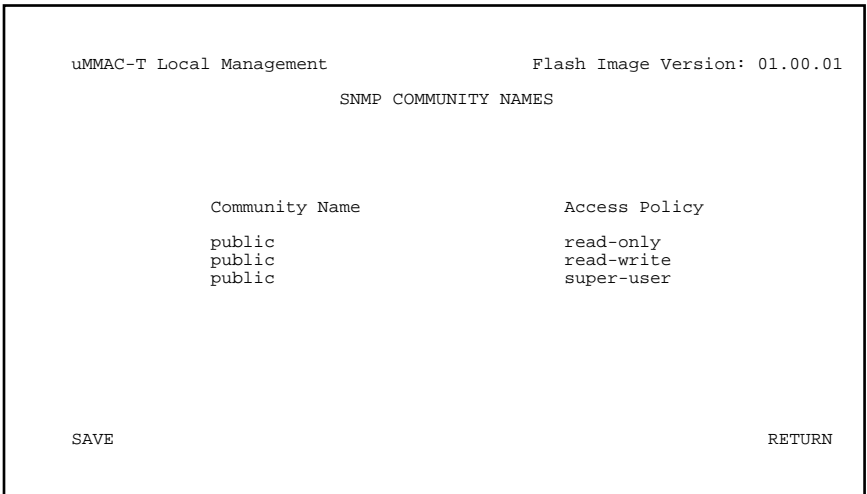
Figure 4-6. SNMP COMMUNITY NAMES Screen

Instructions for using SNMP COMMUNITY NAMES screen fields are provided below.

Community Name

This field displays designated user names.

Access Policy

This field displays the access privileges accorded to each community name.

Editing the Community Name field

1. Highlight the Community Name field.

2. Type in the password, up to 32 characters in length, into the field.

   If you press the **Return key** without entering a password, the field defaults to **Public**.

3. Highlight the **SAVE** command and then press the **Return key**.

   The "SAVED" message appears indicating that your changes have been saved to memory.

4.3.4 The SNMP TRAPS Screen

Use the SNMP TRAPS screen (Figure 4-7) to designate which remote management workstations will receive traps from the MicroMMAC-T. Traps provide messages about network and device operational statistics.

```
   uMMAC-T Local Management              Flash Image Version: 01.00.01

                              SNMP TRAPS



   Trap Destination      Trap Community Name              Enable Traps
   xxx.xxx.xxx.xxx           public                           [YES]
   xxx.xxx.xxx.xxx           public                           [YES]
   xxx.xxx.xxx.xxx           public                           [YES]
   xxx.xxx.xxx.xxx           public                           [YES]
   xxx.xxx.xxx.xxx           public                           [NO]
   xxx.xxx.xxx.xxx           public                           [NO]
   xxx.xxx.xxx.xxx           public                           [NO]
   xxx.xxx.xxx.xxx           public                           [NO]



   SAVE                                                       RETURN
```
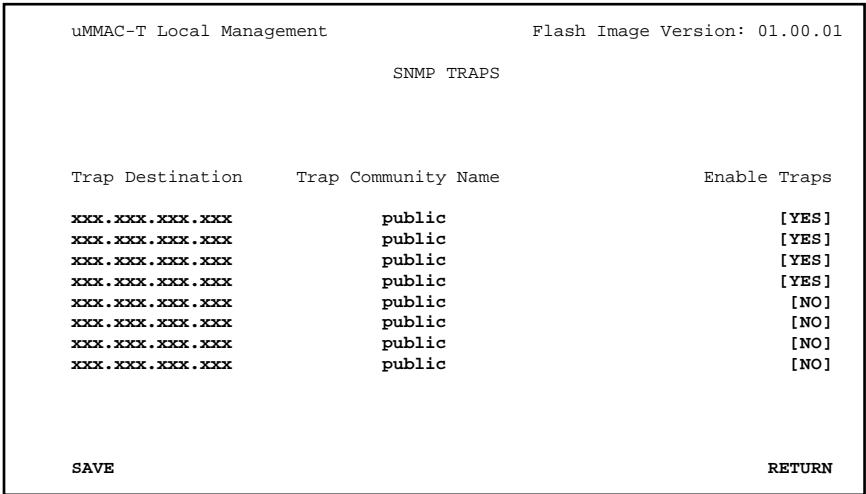
Figure 4-7. SNMP TRAPS Screen

The following sections discuss the fields on the SNMP TRAPS Screen and provide instructions for using them.

Trap Destination

This field shows the IP Address of the workstation that receives traps from the MicroMMAC-T.

Trap Community Name

This field displays the user-defined name of the SNMP Compliant Network Management Stations that receive traps.

Enable Traps

This field lets you enable the transmission of SNMP trap messages.

Setting SNMP Traps

1. Highlight the Trap Destination field.

2. Enter the IP address of the station you want to receive traps from the MicroMMAC-T. The format for this entry is XXX.XXX.XXX.XXX, with the value of XXX ranging from 0 to 255.

3. Press the **Return key**.

   If the format is invalid, the "INVALID IP FORMAT" message appears. Re-type the Trap Destination IP address using the correct format.

4. Highlight the Trap Community Name field.

5. Enter the community name of the device to receive traps and then press the **Return key**.

   If you press the **Return key** without entering a community name, the field defaults to <**CR**>.

6. Highlight the Enable Traps field.

7. Enter **Y** (yes) to send traps from the MicroMMAC-T to the destination workstation, or **N** (no) to prevent traps from being sent.

8. Highlight the **SAVE** command and then press the **Return key**.

   The "SAVED" message appears indicating that your changes have been saved to memory.

4.3.5 The RING SECURITY Screen

The MicroMMAC-T acts as the Ring Security Monitor for the entire ring. Users who have Super-User privileges can control access to the Token Ring network through the RING SECURITY screen (Figure 4-8). When Ring Security is enabled, the MicroMMAC-T stores in a secure database in NVRAM an allowed stations list consisting of the MAC addresses of up to 255 stations on the network.

```
    uMMAC-T Local Management                Flash Image Version: 01.00.01

                             RING SECURITY

                            STATION ADDRESS
                            xx-xx-xx-xx-xx-xx








    Stn Edit  00-00-00-00-00-00  [ Add ]     Security Mode [  Disabled   ]

     SAVE/EXECUTE                                              RETURN
```

Figure 4-8. RING SECURITY Screen

Only stations on the ring's allowed list can enter the ring. The MicroMMAC-T retains this allowed list and automatically re-enables ring security whenever you power up or reset the unit.

You can select from two modes of ring security:

• Alarm Only

• Alarm/Remove.

Use the MicroMMAC-T in Alarm Only mode to add stations to the ring's allowed list. In Alarm Only mode, new stations can enter the ring, but a "station added" trap notifies the Network Management Station (NMS) of the event. The trap includes the new station's MAC address so that you can decide whether to retain the new station on the ring.

Each address you approve automatically becomes part of the ring's allowed list. Later, you can add more stations to the allowed list by temporarily disabling ring security, then re-enabling it using the Alarm Only feature.

NOTE: Do not enable Ring Security on more than one management module per ring because one management module is sufficient.

In Alarm/Remove mode, the MicroMMAC-T sends a "Remove MAC Frame Command" to new stations attempting to enter the ring. A trap sent to the NMS informs it of the action taken. If the Remove MAC Frame Command fails to remove the new station after three attempts, a trap to the NMS informs it that "the station could not be removed."

The following sections discuss RING SECURITY screen fields and provide instructions for using them.

NOTE: Before enabling ring security, you need to designate which Network Management Stations you wish to receive traps. Refer to Section 4.3.4 for more information.

STATION ADDRESS

This field lists up to 255 MAC addresses on the ring security allowed list.

Stn Edit

Use the Station Edit command to add or delete stations from the allowed list and to edit single entries on the allowed list.

Security Mode

Use this command to set the level of security for the ring. Select from the following Security Modes:

- **Disabled** - Use this option to temporarily disable ring security so that new stations can enter the ring. This is the factory default setting.

- **Alarm Only** - In this mode new stations can enter the ring, but the NMS receives a *station added* trap. The trap includes the new station's MAC address so that the NMS can decide if the new station should be allowed on the ring.

NOTE: The NMS receives each station added *trap once only.*

- **Alarm/Remove** - This is the highest level of ring security and **locks the ring to new stations**. In Alarm/Remove mode, new stations attempting to enter the ring receive a *Remove MAC Frame Command*, and a trap informs the NMS of the action taken. The *Remove MAC Frame Command* tries to automatically remove the station from the ring. If it cannot remove the station from the ring after three attempts,

it sends a trap to the NMS informing it that the station could not be removed. The station must then be physically removed from the ring.

SAVE/EXECUTE

Use this field to save changes made to ring security in the MicroMMAC-T's NVRAM. You must use the **SAVE/EXECUTE** command for your changes to take effect.

NEXT_SCREEN

Use this command to scroll to the next screen of the allowed list database.

PREVIOUS_SCREEN

Use this command to scroll back to the previous screen of the allowed list database.

RETURN

Use this command to exit the RING SECURITY screen and return to the SETUP MENU screen.

Changing the Security Mode

1. Highlight the Security Mode field.

2. Toggle through options (**Disabled**, **Alarm Only**, **Remove/Alarm**) and select the desired option.

3. Highlight the **SAVE/EXECUTE** command and then press the **Return key**.

   The MicroMMAC-T enables the selected mode of ring security. The following message appears at the top of the screen: "SECURITY MODE CHANGED."

Building the Allowed List Automatically

1. Set the Security Mode to **Disabled** (as described above) and then set the Security Mode to **Alarm Only.**

   Ring Security automatically builds an allowed list only after the **Alarm Only** mode has been invoked from the **Disabled** mode.

2. Highlight the **SAVE/EXECUTE** command and then press the **Return key**.

Viewing the Revised Allowed List

1. Highlight the **RETURN** command and then press the **Return key**.

   The SETUP MENU screen appears.

2. Highlight RING SECURITY and then press the **Return key.**

   The RING SECURITY screen appears, showing the revised Station Address allowed list.

Adding Stations to the STATION ADDRESS Allowed List

1. Highlight the Stn Edit field.

2. Using the following format, type the MAC address of the station you want to add: XX-XX-XX-XX-XX-XX. Use the **Backspace key** to delete unwanted characters.

3. Highlight the **Add/Del** field and then select **Add**.

4. Highlight the **SAVE/EXECUTE** command and then press the **Return key**.

   The new MAC address appears on the STATION ADDRESS allowed list.

Deleting Stations from the STATION ADDRESS Allowed List

1. Set ring security to the Alarm/Remove mode.

2. Highlight the Stn Edit field.

3. Using the following format, type the MAC address of the station you want to delete: XX-XX-XX-XX-XX-XX. Use the **Backspace key** to delete unwanted characters.

4. Highlight the **Add/Del** field and select **Del**.

5. Highlight the **SAVE/EXECUTE** command and then press the **Return key**.

   The station's MAC address no longer appears on the STATION ADDRESS allowed list.

NOTE: You cannot delete the Micro-MMAC-T address from the list.

4.3.6 The DEVICE STATISTICS Screen

The DEVICE STATISTICS screen (Figure 4-9) displays ring information, isolating errors, and non-isolating errors.

```
    uMMAC-T Local Management                    Flash Image Version: 01.00.01

                          DEVICE STATISTICS (TOTAL)



                                     RING INFORMATION
        Frames Received: 4572      Active Monitor Addr: 00-00-B8-28-08-54
        KBytes Received: 10157            Ring Status: Normal
        Errors Received: 0               Ring Number: 0
          Beacon States: 0           Stations on Ring: 1
            Ring Purges: 2              Ports Enabled: 0
 Active Monitor Changes: 1           Ring Speed (Mb/s): 4

          ISOLATING ERRORS              NON-ISOLATING ERRORS
            Line Errors: 0              Lost Frame Errors: 0
           Burst Errors: 0            Frame Copied Errors: 0
              AC Errors: 0          Rcvr Congestion Errors: 0
 Abort Transmit Errors: 0                  Token Errors: 0
        Internal Errors: 0              Frequency Errors: 0

              [    TOTAL    ]                     [ REFRESH 3sec ]    RETURN
```

Figure 4-9. DEVICE STATISTICS Screen

The following sections discuss the fields on the DEVICE STATISTICS screen and provide instructions for using them.

DEVICE STATISTICS

The DEVICE STATISTICS counter mode field at the top of the screen (Figure 4-9 shows an sample screen in the TOTAL counter mode) displays the method used for compiling device statistics. The method is selected from the corresponding counter mode field located at the bottom of the screen.

The MicroMMAC-T compiles and displays statistics from three separate counter modes:

• **ACCUMULATE**: This mode lets you initiate a new statistic count for a specified time period (procedure described below).

• **DELTA**: This mode automatically displays statistics describing network performance since the last screen refresh (3 to10 seconds).

- **TOTAL**: This mode automatically displays statistics describing network performance since the last power-up.

Selecting the Device Statistics Counter Mode

1. Highlight the current mode at the bottom of the screen and toggle to a counter mode selection.

2. Press the **Return key**.

   The selected counter mode appears at the top and the bottom of the screen.

Using the ACCUMULATIVE Counter Mode

1. Select the ACCUMULATIVE counter mode.

   The following fields appear on the screen: Date Cleared and Time Cleared in the upper right part of the screen and **Clear** at the lower left part of the screen.

2. Highlight **Clear** and press the **Return key**.

   The Date Clear and Time Clear fields change to reflect the beginning of the period over which you want to view device statistics.

Setting the Refresh Field

This field displays the time interval between screen counter updates. You can choose refresh intervals from 3 to 10 seconds.

1. Highlight the **REFRESH3sec** field at the bottom of the screen.

2. Use the **spacebar** to toggle through time intervals, or use **Shift** and the + **key** to increment the time interval and Shift and the - **key** to decrease the time interval.

3. Press the **Return key** to save your changes.

DEVICE STATISTICS screen read-only fields are described below:

Frames Received

This field displays the frames received by the MicroMMAC-T.

KBytes Received

This field displays the sum in kilobytes of frames received by the MicroMMAC-T.

Errors Received

This field displays the Isolating and Non-Isolating Errors (described below) detected on the ring.

Beacon States

This field displays the beacon conditions detected on the ring. Stations transmit beacons when they detect bit streaming or signal loss on the ring.

Ring Purges

This field displays the ring purge frames transmitted by the active monitor.

Active Monitor Changes

This field displays the number of times the active monitor has changed.

ISOLATING ERRORS

Isolating Errors are "soft" ring errors that indicate the domain of a fault. That is, the active monitor can isolate the fault's region to the transmitting adapter, the receiving adapter, the cable, and the components between them. The errors are described below:

Line Errors

This field displays the total line errors detected on the ring. Line Errors are corrupted frames that are detected by a node. This type of error normally occurs when stations enter and leave the ring.

This error can also indicate a problem with the receiver of the reporting node, or the transmitter of its Nearest Active Upstream Neighbor (NAUN), or the cabling and hub hardware between them.

Burst Errors

This field displays the total burst errors detected on the ring. Burst Errors are the absence of clocking signals at a node's receiver. This error normally

occurs when stations enter or leave the ring with the absence of phantom current.

This error can also indicate a problem with the receiver of the reporting node, or the transmitter of its NAUN, or the cabling and hub hardware between them.

AC Errors

This field displays the total Address Recognized/Frame Copied errors. This indicates that the reporting NAUN is faulty. The node cannot set the address recognized indicator and/or frame copied indicator bits in the frame which it has copied. This leaves the downstream node with an incorrect NAUN address.

Abort Transmit Errors

This field displays the total abort delimiter frames transmitted by a station. This indicates that either the reporting node has detected an error on itself, or there is an error with its NAUN, or the cabling and wiring hubs between them.

Internal Errors

This field displays the total internal errors detected by the adapter's hardware and/or firmware. These errors cause the adapter to remove itself from the ring and indicates a problem with the adapter hardware or firmware.

RING INFORMATION

Ring Information provides ring status information.

Active Monitor Addr

This field displays the MAC address of the active monitor. The active monitor initiates recovery procedures from various error situations.

Ring Status

This field displays the following Ring Status conditions:

- **Unknown --** Indicates that the management station is not inserted into the ring and therefore cannot determine the ring state

- **Closed --** Indicates that the management station has closed the adapter

- **Normal --** Indicates the ring is running with no problems, and tokens are being detected by the management station

- **Purge --** Indicates that the active monitor has issued a ring purge command. Communications will be restored when a new token is released

- **Contention --** Indicates that the ring has entered into the active monitor contention process to determine a new active monitor for the ring

- **Beaconing --** Indicates that the management station has detected a beacon frame

- **Lobe Fail --** Indicates that a station failed the lobe self-test when it attempted to insert into the ring

Ring Number

This field displays the assigned number of rings on the network.

Stations on a Ring

This field displays the number of stations inserted into the ring.

Ports Enabled

This field displays the number of network lobe ports enabled.

Ring Speed

This field displays the ring speed of the MicroMMAC-T as either 4 Mb/s or 16 Mb/s.

NON-ISOLATING ERRORS

Non-Isolating Errors are "soft error" conditions that could have been caused by any station on the ring. Their fault domain cannot be detected.

Lost Frame Errors

This field displays the total number of Lost Frame Errors. These errors occur when the adapter fails to receive the end of the frame it has just transmitted. The frame was lost somewhere on the ring but there is no way to pinpoint where. This can be caused by stations entering or leaving the ring.

Frame Copied Errors

This field displays the total number of Frame Copied Errors. These errors occur when a station finds a frame with its address as the destination, but finds the address recognized indicator bits not set to zero. This indicates a possible duplicate address.

Rcvr Congestion Errors

This field displays the total number of Rcvr Congestion Errors. This indicates a station is receiving/repeating a frame and recognizes a frame addressed to it, but has no buffer space available for the frame.

Token Errors

This field displays the total number of Token Errors. Token Errors occur when an active monitor does not see a token circulating on the ring before its Timer Valid Transmission (TVX) time expires (e.g. a lost frame error has occurred), or sees a recirculating frame or token. The active monitor is responsible for purging the ring and issuing a new token.

Frequency Errors

This field displays the total number of frequency errors. This indicates that the frequency of the incoming signal deviates excessively from the adapter's onboard crystal oscillator. It could indicate an error in this node's oscillator, the active monitor, or any node in between. When the node detects a frequency error, it enters the monitor contention process to establish a new active monitor.

4.3.7 The CHASSIS STATUS VIEW Screen

The CHASSIS STATUS VIEW screen lets you monitor and manage the operational status of the station ports and RI/RO ports on the MicroMMAC-T and the station ports on its attached non-intelligent STH hubs. It also lets you monitor and managed attached BRIMs (the CR-BRIM-W/T and the MicroSNAC device provide their own comprehensive console access management tools).

The CHASSIS STATUS VIEW screen supports three separate screen modes:

- OPERATIONAL (Figure 4-10) -- Lets you monitor the operational status of the Token Ring network

- ADMINISTRATIVE (Figure 4-11) -- Lets you manage access to the Token Ring network

- RING OUT ENABLE (Figure 4-12) -- Lets you enable all ports

The following sections describe generic CHASSIS STATUS VIEW screen fields and control procedures.

Mode

This field, located within parentheses next to the screen title, displays the current screen mode.

Port Status

These fields consist of the columns of numbered ports located under the device identifiers (MMAC24, STH24, et al). They display port-status information and let you selectively enable and disable ports when in the ADMINISTRATIVE mode.

Virtual Flexible Network Bus (VFNB)

Use this field (a quasi Network Bus), located at the top of each the port-status column under the device identifier, to either bypass or activate a module, or hub, when in the ADMINISTRATIVE mode.

Possible VFNB screen configurations for **Enabled** modules are described as follows:

- Attached left (**<----|**): The module is connected via cabling to the next module. For example, the MicroMMAC-T configured as module 1 is connected to STH module 2

- Attached right (**|---->**): The STH 2, for example, is connected to the MicroMMAC-T

- Attached left/right (**<---->**): The STH is connected to the STH or MicroMMAC-T before it and the STH after it.

- Detached (**|-----|**): The MicroMMAC-T is not connected to an STH module.

VFNB screen configurations for **Bypassed** modules are described as follows:

- Bypassed (|**--B--**|): The MicroMMAC-T is in the bypass mode and is not connected to an STH module.

- Bypassed left (**<--B--**|): The MicroMMAC-T or the STH is in the bypass mode, but it is connected to the next module.

- Bypassed right (|**--B-->**): The STH is in the bypass mode, but it is connected to the module before it.

- Bypassed left/right (**<--B-->**): The STH is bypassed by the STH or MicroMMAC-T before it and the STH after it.

Screen Mode Status

Use this field to select ADMINISTRATIVE, OPERATIONAL, or RING OUT ENABLE screen status modes. It is located within parentheses at the bottom of the screen.

ENABLE ALL PORTS (ADMINISTRATIVE mode only)

Use this field to enable all MicroMMAC-T and connected STH hub ports.

NEXT

Use this field to scroll to the next screen.

PREVIOUS

Use this field to scroll to the previous screen. This field appears only after the NEXT command has been invoked.

REFRESH 3SEC

This field displays the time interval between screen counter updates. You can choose refresh intervals of 3 to 10 seconds.

RETURN

Use this field to return to the STATUS MENU screen.

Selecting OPERATIONAL, ADMINISTRATIVE, or RING OUT ENABLE Mode Screens

1. Highlight the screen mode status field.

2. Toggle to a screen mode selection, or press **a** for ADMINISTRATIVE, **o** for Operational, or **r** for RING OUT ENABLE, and then press the **Return key.**

   The selected screen mode appears.

Setting the REFRESH Field

1. Highlight the **REFRESH3sec** field.

2. Use the spacebar to toggle through time intervals, or use **Shift** and the + **key** to increment the time interval and **Shift** and the - **key** to decrease the time interval.

3. Press the **Return key** to save your changes.

Using the OPERATIONAL Mode Screen

The OPERATIONAL mode screen (Figure 4-10) is a display-only screen that shows the token ring access status of hub ports and devices. By default the OPERATIONAL mode screen shows the status of ports 1-12 for the MicroMMAC-T and attached STH hubs.

```
   uMMAC-T Local Management                 Flash Image Version: 01.00.01
                    CHASSIS STATUS VIEW (   OPERATIONAL   )
                              5          4          3          2          1
                                                             STH24      MMAC24
                                                             |--->      <---|
                                                             16Mb/s     16Mb/s
                                                           1 [BYP]    1 [INS]
                                                           2 [BYP]    2 [INS]
                                                           3 [ENB]    3 [INS]
                                                           4 [LNK]    4 [INS]
                                                           5 [LNK]    5 [INS]
                                                           6 [LNK]    6 [ENB]
                                                           7 [ENB]    7 [ENB]
                                                           8 [ENB]    8 [ENB]
                                                           9 [INS]    9 [ENB]
                                                          10 [INS]   10 [ENB]
                                                          11 [INS]   11 [ENB]
                                                          12 [INS]   12 [ENB]


 NEXT                          [    OPERATIONAL    ] [ REFRESH 3sec ] RETURN
```

Figure 4-10. CHASSIS STATUS VIEW (OPERATIONAL) Screen

Station ports, on any module, can be in either of the following four operational states:

- **ENB (Enabled)**: The port is enabled and allows an attached station to enter the ring.

- **BYP (Bypassed)**: The port is disabled and the station is not on the ring.

- **LNK (Linked)**: The port is disabled and an attached station is trying (sending phantom current) to access the ring

- **INS (Inserted)**: The port is enabled and the attached station is operational.

Ring In/Ring Out ports can be in either of the following two operational states:

- **ACT (Activated)**: The port or device is enabled and connected to the ring trunk cable.

- **WRP (Wrapped)**: The port or device is in the wrap state; there is no access to the ring trunk cable.

BRIMs and the MicroSNAC device can be in either of two operational states: **ENB** or **BYP**.

To display the status of ports 13-24:

1. Highlight the **NEXT** command and then press the **Return key.**

   The screen displays the status of ports 13-24 for all modules.

2. Highlight the **PREVIOUS** command and then press the **Return key** to return to the previous screen.

To display the status of RI/RO ports, BRIMs, or the MicroSNAC device:

1. Highlight the **NEXT** command and then press the **Return key.**

   Repeat Step 1. as many times as necessary to display the status of the device you want.

   The screen displays the selected device's status.

2. Highlight the **PREVIOUS** command and then press the **Return key** to return to the previous screen.

Using the ADMINISTRATIVE Mode Screen

In addition to displaying the operational status of ring ports, the ADMINISTRATIVE mode screen provides you with two methods for controlling access to them:

- Bypassing ports.

- Enabling and Disabling ports.

When you bypass a module, or device, you not only remove it from the Token Ring to which it was previously attached, but you also establish a separate, or stand-alone, Token Ring composed only of the terminals attached to the ports on the bypassed module.

This capability is useful, for example, when you want to establish a secondary ring to run at a slower data transmission speed, or for segregating a user group sharing a common application, or for security reasons.

Enabling or disabling ports simply turns them on and off.

```
    uMMAC-T Local Management                   Flash Image Version: 01.00.01
                    CHASSIS STATUS VIEW (  ADMINISTRATIVE  )
                                  5         4         3         2          1
                                                            STH24       MMAC24
                                                            |--->       <---|
                                                            16Mb/s      16Mb/s
                                                            1 [ON]      1 [ON]
                                                            2 [ON]      2 [ON]
                                                            3 [ON]      3 [ON]
                                                            4 [ON]      4 [ON]
                                                            5 [ON]      5 [ON]
                                                            6 [ON]      6 [ON]
                                                            7 [ON]      7 [OFF]
                                                            8 [ON]      8 [OFF]
                                                            9 [ON]      9 [OFF]
                                                           10 [ON]     10 [OFF]
                                                           11 [ON]     11 [OFF]
                                                           12 [ON]     12 [OFF]

 NEXT   ENABLE ALL PORTS              [ ADMINISTRATIVE   ] [ REFRESH 3sec ]  RETURN
```

Figure 4-11. CHASSIS STATUS VIEW (ADMINISTRATIVE) Screen

To enable and disable select ports:

1. Highlight the port status fields showing either **ON** or **OFF.**

2. Toggle between **ON** and **OFF**, make your selection, and then press the **Return key**.

    Enabled ports provide access for other stations into the token ring network; disabled ports cannot provide access to the ring until they have been enabled.

To enable all ports for all modules:

1. Highlight the **ENABLE ALL PORTS** field.

2. Press the **Return key**.

    All ports are enabled.

To bypass all ports on a module:

1. Highlight the VFNB (located under the module identifier).

2. Use the spacebar to toggle from the horizontal dash character, to the bypass mode identifier, (**-B-)**, make your selection and then press the **Return key**.

    The entire module is bypassed from the Token Ring.

To reconnect a module to the token ring:

1. Highlight the bypass mode identifier, (**-B-)**.

2. Toggle to the vertical dash character and then press the **Return key**.

    The module is now connected to the Token Ring.

Using the RING OUT ENABLE Mode Screen

Use the RING OUT ENABLE mode screen to switch ports from the default Station (**STN**) status to RING OUT (**RO**) enable status.

```
    uMMAC-T Local Management                Flash Image Version: 01.00.01
                    CHASSIS STATUS VIEW ( RING OUT ENABLE  )
                               5          4          3          2          1
                                                              STH24       MMAC24
                                                              |--->       <---|
                                                              16Mb/       16Mb/s
                                                              1 [RO]       1 [STN]
                                                              2 [RO]       2 [STN]
                                                              3 [RO]       3 [STN]
                                                              4 [RO]       4 [STN]
                                                              5 [RO]       5 [STN]
                                                              6 [STN]      6 [RO]
                                                              7 [STN]      7 [RO]
                                                              8 [STN]      8 [RO]
                                                              9 [STN]      9 [RO]
                                                             10 [STN]     10 [RO]
                                                             11 [STN]     11 [RO]
                                                             12 [STN]     12 [RO]


  NEXT                        [ RING  OUT  ENABLE ] [ REFRESH 3sec ]  RETURN
```

Figure 4-12. CHASSIS STATUS VIEW (RING OUT ENABLE) Screen

To switch to and from STN and RO:

1. Highlight the port-status field showing **STN** or **RO**.

2. Toggle between **STN** and **RO**, make selection and then press the
    Return key.

    You can now connect the RO enabled ports to Multi-Station Access
    Unit (MAU) RI ports.

4.3.8 The COMPONENT STATUS Screen

The COMPONENT STATUS Screen (Figure 4-13) displays the
Administrative status of components operating in the MicroMMAC-T.

```
uMMAC-T Local Management              Flash Image Version: 01.00.01

                            COMPONENT STATUS

        Component Name                      Admin. Status

        Chassis Mgr                         enabled
        Local Mgmt                          enabled
        SNMP Agent                          enabled
        Protocol Stack                      enabled
        Telnet                              enabled
        RMON                                enabled
        Network 1                           enabled
        Network 2                           enabled




                                                    RETURN
```

Figure 4-13. COMPONENT STATUS VIEW Screen

4.3.9 The MIB NAVIGATOR Screen

The MIB NAVIGATOR screen (Figure 4-14) provides the MIB NAVIGATOR prompt where you can issue commands for navigating and modifying the Management Information Base (MIB) structure. MIBs are the databases of objects used for managing MicroMMAC-T devices management systems.

```
          Welcome to Cabletron MicroMMAC-T Revision 01.00.01

       MIBNav->  help
```

Figure 4-14. MIB Navigator Screen

The following sections define MIB commands and describe how to get help on using them.

To access a list of MIB commands:

Type "help" or "?" at the MIB prompt and then press the **Return key**.

The MIB NAVIGATOR screen appears showing the MIB Navigational and Built In commands listed in Table 4-2.

To get help on specific commands:

Type **help <command>** and then press the **Return key**.

To escape from the MIB NAVIGATOR screen:

Type either of the **Special commands:** done, exit, or quit at the prompt and press the **Return key** to return to the MAIN MENU screen**.**

Table 4-2. MIB Commands

Navigation			Built-In			Special
branch	cd	ctron	arp	defroute	netstat	done
dir	get	ls	ping	snmp-branch	snmpget	quit
mib2	next	pwd	snmpset	snmptree	tracer-oute	exit
set	show	su				
tree	whoami					

Navigational commands

Navigational commands allow you to access and manage MIB objects for the device. MIB Commands are described as follows:

branch

This command displays the object leaves of a specified directory tree.

cd

This command changes directories within a MIB sub-tree.

ctron

This command changes directories to the Cabletron MIB.

dir, ls, show

These commands display contents of a specified sub-tree.

get

This command provides you with a specified object value.

mib2

This command changes directories to MIB2.

next

This command shows the next leaf in a path.

pwd

This command displays the full path name of the directory in which you are working.

set

This command lets you set the value of a managed object.

su

This command lets you change your community name.

tree

This command displays an entire MIB for a device.

whoami

This command displays community name and access privileges to the MIB.

Built-In commands

Built-In commands allow you to access and manage network devices connected to the device. Commands are described as follows:

arp

This command lets you access the Address Resolution Protocol (arp) cache to view cache data delete entries, or add a static route.

defroute

This command lets you set the default IP route to a device through a specified interface.

netstat

This command lets you display general network statistics for a managed device.

ping

This command let you generate an outbound ping request.

snmp branch

This command lets you query another SNMP device.

snmpget

This command lets you query another SNMP device to obtain a value for an object.

snmpset

This command lets set the values of object in other devices.

snmptree

This command displays all objects and their values in a device.

traceroute

This command generates a TRACEROUTE request to an IP address.

4.3.10 The FLASH DOWNLOAD Screen

The FLASH DOWNLOAD Screen (Figure 4-15) lets you upgrade the operating image for the device.It allows you to chose a download method: RUNTIME or DOWNLOAD, to specify method-dependent options, to select a TFTP server, and to select the name and location of the image.

To download a Flash image:
1. Set values for the screen's fields.

2. Highlight **EXECUTE** and then press the **Return key**.

```
  uMMAC-T Local Management              Flash Image Version: 01.00.01

                           FLASH DOWNLOAD


                  Download Method: [RUNTIME]

              Reboot after Download: [YES]


              Flash Image Server IP: xxx.xxx.xxx.xxx

              Flash Image File Name: c:\hex\micro_t.hex


                 Download Server IP: xxx.xxx.xxx.xxx

                 Download File Name: c:\hex\micro_t.fls



   EXECUTE                                                    RETURN
```

Figure 4-15. The FLASH DOWNLOAD Screen

The following sections discuss the fields on the FLASH DOWNLOAD screen and provide instructions for using them.

Download Method field

Use the Download Method field to select either the RUNTIME or the BOOTPROM download method. The Reboot after Download field appears when the RUNTIME method is used, and the Commit to Flash field appears when the BOOTPROM method is used.

The RUNTIME method permanently changes the image in Flash, replacing the currently stored version while the management device is operational. The process neither interrupts network operations nor affects the currently running LM application. When the device is reset, the new image takes effect.

To chose the RUNTIME method:

1. Highlight the Download Method field.

2. Toggle from **BOOTPROM** to **RUNTIME**, if necessary, using the **spacebar**.

The Reboot after Download field appears by default when the **RUNTIME** method is used. If **YES** is selected, the MicroMMAC-T will automatically reset after the image is downloaded into Flash to load the new image into the active system file.

You can choose to use the **BOOTPROM** method also. It forces the device to reset and reboot from the download server rather than from the image stored in Flash.

To choose the BOOTPROM method:

1. Highlight the Download Method field

2. Toggle from **RUNTIME** to **BOOTPROM** using the **spacebar.**

   When **BOOTPROM** is selected, the Commit to Flash toggle field appears, replacing the Reboot after Download field. If **YES** is chosen, the device will automatically replace the old image in Flash with the new image. If **NO** is chosen, the new image will be downloaded into active memory only, leaving the prior image in Flash unaffected and available for use at next reset. The **NO** option allows the user to test a new system file without losing the prior system file.

Flash Image Server IP

This read-only field shows the IP address of the most recently used file server.

Flash Image File Name

This read-only field shows the file name of the most recently downloaded image.

Download Server IP

Use this editable field to enter the IP address of the file server containing the desired Flash image.

Download File Name

Use this editable field to enter the name of the file you want to download.

CHAPTER 5

TROUBLESHOOTING

This chapter describes and explains how to use LANVIEW LEDs and the Liquid Crystal Display (LCD) to troubleshoot physical layer network problems. The chapter concludes with an overview of the POWER UP Diagnostic Test.

5.1 USING LANVIEW LEDs

LANVIEW LEDs (located on the front panel) are Cabletron Systems' built-in visual diagnostic and status monitoring system. Use the LEDs to monitor network status or diagnose physical-layer network problems. Table 5-1 below lists and describes front panel LEDs.

Table 5-1. LANVIEW LEDS

LED NAME	LED COLOR	DEFINITION
Lobe Port Status (Ports 1-24)	Off Green Red Red (blinking)	No Link/Port Enabled Link/Port Enabled No Link/Port Disabled Link or Ring Speed Fault/Port Disabled
16Mb/s (Ring Speed)	Yellow Off	16MbpsRing Speed 4 Mbps Ring Speed
ACT (Network Activity)	Green (Flashing) Red (Flashing) Off	Good Frames Beacon Recovery Running No Activity
MGMT (Network Management)	Green Red	Management Agent Active Management Agent Not Active
CPU (Central Processing Unit)	Off Green (Flashing) Green (Blinking) Red Yellow Yellow/Green	No Power CPU Initializing CPU Functioning (normal) CPU Not Functioning Diagnostic Testing Booting
NOTE: "Flashing" indicates an irregular LED pulse. "Blinking" indicates a steady LED pulse.		

5.2 USING THE LCD DISPLAY

The MicroMMAC-T is equipped with an LCD and a LCD display button as shown in Figure 5-1.
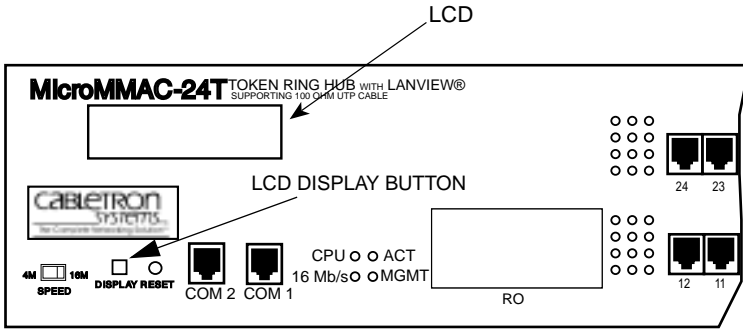
Figure 5-1. LCD Display

The LCD is a diagnostic tool for viewing the following important status information about the MicroMMAC-T:

• Power up diagnostics

• Revision levels

• Hardware, MAC address, or locally administered address

• IP address

• Error conditions.

The LCD presents four types of messages:

• Static System Messages

• Saved Alarm Messages

• Unsaved Initialization Messages

• Saved System Messages

The following sections describe messages for each category.

5.2.1 Static System Messages

Static System messages (Table 5-2) display MicroMMAC-T configuration information. To view them, press and release the Display button (Figure 5-1). Press the Display button to scroll through each message. If the Display button is not pressed again within ten seconds, the display defaults back to the product name.

Table 5-2.   Static System Messages

Displayed Message	Significance
IP Address xxx.xxx.xxx.xxx	Displays current IP address. This can be changed via Local Management
MAC Address xx.xx.xx.xx.xx.xx	Displays Hardware or MAC address
RAM Image Rev. xx.xx.xx	Displays currently executing image
Boot PROM Rev. xx.xx.xx	Displays internal Boot PROM version number
Flash Programmed xx Times	Displays number of times Flash EEPROM has been programmed.
COM 1 Baud Rate xxxxxx	Displays COM 1 Port's current Baud rate
COM 1 Function xxxxxx	Displays COM 1 Port's current function (Local Management console, UPS, or SLIP)
COM 2 Baud Rate xxxxxx	Displays COM 2 Port's current Baud rate
COM 2 Function xxxxxx	Displays COM 1 Port's current function

5.2.2 Alarm Messages

Alarm messages (Table 5-3) describe events that occur within the MicroMMAC-T. To view the Alarm Messages queue, press the Display button (Figure 5-1) and hold for five seconds. Press the Display button to scroll through each message. If the Display button is not pressed again within ten seconds, the display defaults back to the product name.

Table 5-3. Alarm Messages

Displayed Messages	Significance
NO MESSAGES IN QUEUE	No alarm messages in queue. This is the Alarm Messages default setting.
TPIM Inserted	TPIM inserted into RI or RO.
TPIM Removed	TPIM removed from RI or RO.
Stack x Inserted	The x Stack inserted (where x is any value from 2 to 5).
Stack x Removed	The x Stack removed (where x is any value from 2 to 5).
Stack x Port xx Violation	Indicates unauthorized attempt to access net work lobe ports.
uMMACT Port xx Violation	Indicates unauthorized attempt to access network lobe ports.
Ring Beaconing	Indicates a station is attempting to recover from a hardware problem on the ring.
Beacon Recovered	Indicates the ring has recovered from a beaconing situation.
uMMACT Port xx Removed	Indicates that a station has been removed from the ring as a result of the beacon recovery process

Table 5-3.   Alarm Messages (Cont.)

Displayed Messages	Significance
Stack x Port xx Removed	Indicates that a station has been removed from the ring as a result of the beacon recovery process
Ring Port xx wrapped	Indicates a TPIM RI or RO has Autowrapped.
Eagle Reinserting	Indicates that the Eagle chip set is automatically being reinserted.
Fault Recovery Oscillation	Indicates that the network has been in and out of a beaconing state several times.

5.2.3 Unsaved Initialization Messages

Unsaved intialization messages appear on the LCD as the event occurs, but are not saved in a buffer for future recall. Table 5-4 lists unsaved failure or error messages (If Failure or Error Messages appear, call your Cabletron Technical Support representative.), and Table 5-5 lists normal unsaved initialization messages.

Table 5-4.   Unsaved Failure or Error Messages

Messages	
• 82C54 Failure	• Eagle Failure
• NVRAM Failure	• LDRAM Failure
• Bit Swap Failure	• Modem SCC Error
• Console SCC Error	• SDRAM Failure
• Ctrl. Reg. Err.	

Table 5-5. Normal Unsaved Initialization Messages

Messages	
• Bit Swap Test	• MicroMMAC-xx Cabletron
• Boot Complete	• Programming LRAM
• Boot From Flash	• RARP Req. State
• BOOTP Discovery	• Test in Progress
• Eagle Test	• TFTP Complete
• Erasing Flash	• TFTP in Progress
• Flash Programmed	• TFTP Req. State
• Hardware Init	• Writing Flash

5.2.4 Saved System Messages

Saved System Message are device-related start-up or boot strap messages, BOOTP/TFTP host, or start-up error messages as shown in Table 5-6. To access the Saved System Messages queue, enter the Saved Alarm Messages queue. While in the Alarm Messages queue, press the Display button and hold for two seconds. Scroll through each message by pressing the Display button. If the Display button is not pressed again for ten seconds, the LCD defaults to the product name.

Table 5-6. Saved System Messages

Displayed Message	
• BootP Host xxx.xxx.xxx.xxx	• TFTP File xxxxxxxxxxxxxxx
• Last TFTP File xxxxxxxxxxxxxxx	• TFTP Host xxx.xxx.xxx.xxx
• Last TFTP Host xxx.xxx.xxx.xxx.	

5.3 VIEWING POWER UP DIAGNOSTIC TESTS

The MicroMMAC-T runs from BootPROM comprehensive booting and diagnostic tests of the device whenever it has been started or reset. You can view a chronicle of the tests and any error condition messages they produce by connecting your terminal to the COM 2 port of the MicroMMAC-T. BootPROM loads the test image into Flash at the completion of the test, which lasts approximately two minutes.

NOTE: The LCD displays the following message whenever the POWER UP DIAGNOSTIC test is running: "Cabletron Test in Progress." See Section 5.2 for information about LCDs.

The testing process generates information and displays it on your terminal. The only time you can issue commands controlling the display of the information is when an error condition has been discovered.

Figure 5-2 shows the opening test information sequence of the POWER UP DIAGNOSTIC screen depicting an error condition message with response options that are discussed below.

```
 POWER UP DIAGNOSTIC

   register tests
   memory tests
   SCC COM 1 tests
   SCC COM 2 tests
   T.R. adapter tests


 Error: xxxxxx (Error message)
 Do you wish to continue, retry, or loop (c, r, or l)?



               CABLETRON Systems, Incorporated
                    P.O.Box 5005
                 Rochester, NH 03866-5005
              MicroMMAC-T Diagnostic/Boot Display
```

Figure 5-2. POWER UP DIAGNOSTIC screen

Responding to Error Messages

Error messages provide you with three response options:

• continue

- retry

- loop

Choosing continue, or **c,** lets you proceed with the remainder of the diagnostic test. Choosing retry, or **r**, lets you repeat the test that produced the error message. Choosing loop, or **l**, lets you continuously repeat the test that produced the error message until you decide to stop it by pressing the **Delete key**.

NOTE: Call your Cabletron Technical Support representative whenever you discover a system-level error.

To execute a response option:

Type an option letter at the prompt located at the end of the response option question and then press the Return key.

To return to Local Management:

Press the **Return key**.

POWER SUPPLY CORD

The main cord used with this equipment must be a 2 conductor plus ground type with minimum 0.75 mm square conductors and must incorporate a standard IEC appliance coupler on one end and a mains plug on the other end which is suitable for the use and application of the product and that is approved for use in the country of application.

GERMAN:

Die Netzleitung, die mit diesem Geraet benuetzt wird, soll einen zwei Leiter mit Erdleiter haben, wobei die Leiter mindestens 0.75 mm sind, mit einer normalen IEC Geraetesteckdose an einem Ende und einem Geraetestecker am anderen Ende versehen sind, der fuer den Gebrauch und die Anwendung des Geraetes geeignet und der zum Benuetzen im Lande der Anwendung anerkannt ist.

SPANISH:

El cable principal de la red eléctrica utilizado con este equipo debe tener 2 conductores y 1 toma de tierra con un mínimo de 0.75 mm2 cada uno y necesita tener un aparato de acoplamiento standard IEC en un extremo y un enchufe para el cable principal de la red eléctrica en el otro extremo, lo cual sea adecuado para el uso y applicación del producto y lo cual sea aprobado para uso en el pais de applicación.

FRENCH:

Le cordon d' alimentation reliant cet appareil au secteur doit obligatoirement avoir deux fils conducteurs de 0.75 mm2 minimum et un fil de terre. It doit également être équipé du côté appareil d'une fiche agrée IEC et du côte secteur, d'une prise adaptée à l'usage du produit et aux normes du pays où l'appareil est utilisé.